THE American Journal OF Gastroenterology

VOL. 24, NO. 4 OCTOBER, 1955

Panel Discussion on the Management of Gastric Ulcer
The Surgical Aspects of Portal Decompression
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Some Oral Lesions of Gastroenterologic Interest
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The Elimination of Postoperative Morbidity in the Surgical Management of Chronic Idiopathic Ulcerative Colitis
Anomalies of Intestinal Rotation in Gastrointestinal Practice

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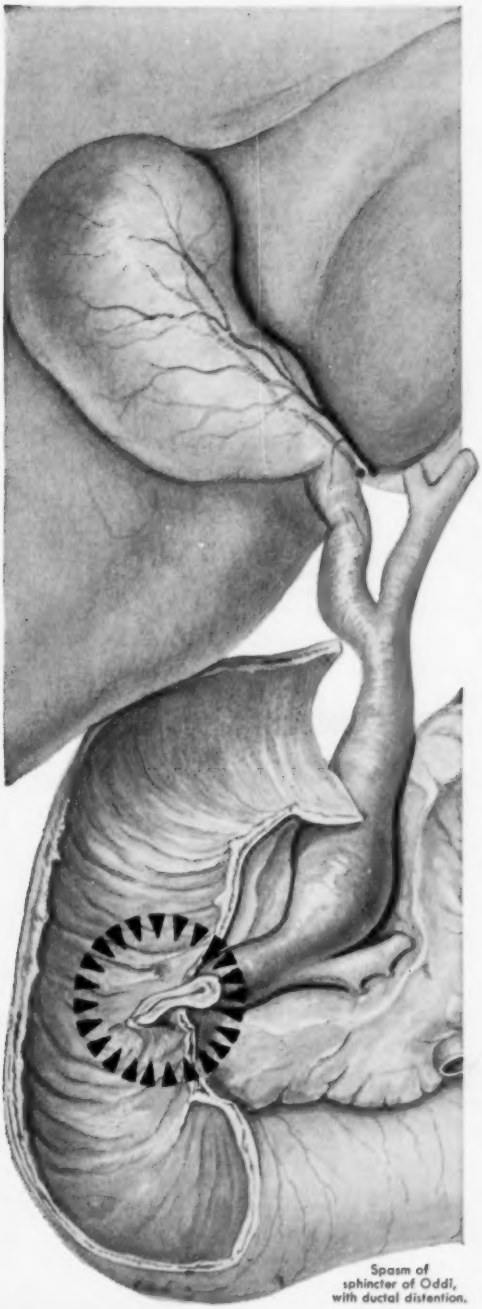

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1. Irvin, J. L.: The Secretion and Enterohepatic Circulation of Bile Acids: Replacement of Bile Acids in Biliary Insufficiency, North Carolina M. J. *13*:206 (April) 1952.

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THE American Journal OF Gastroenterology

(FORMERLY THE REVIEW OF GASTROENTEROLOGY)

The Pioneer Journal of Gastroenterology, Proctology and Allied Subjects in the United States and Canada

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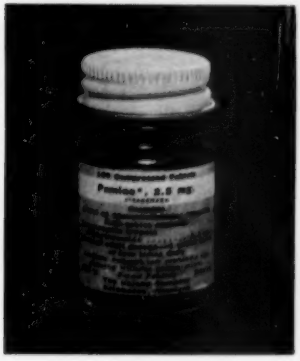

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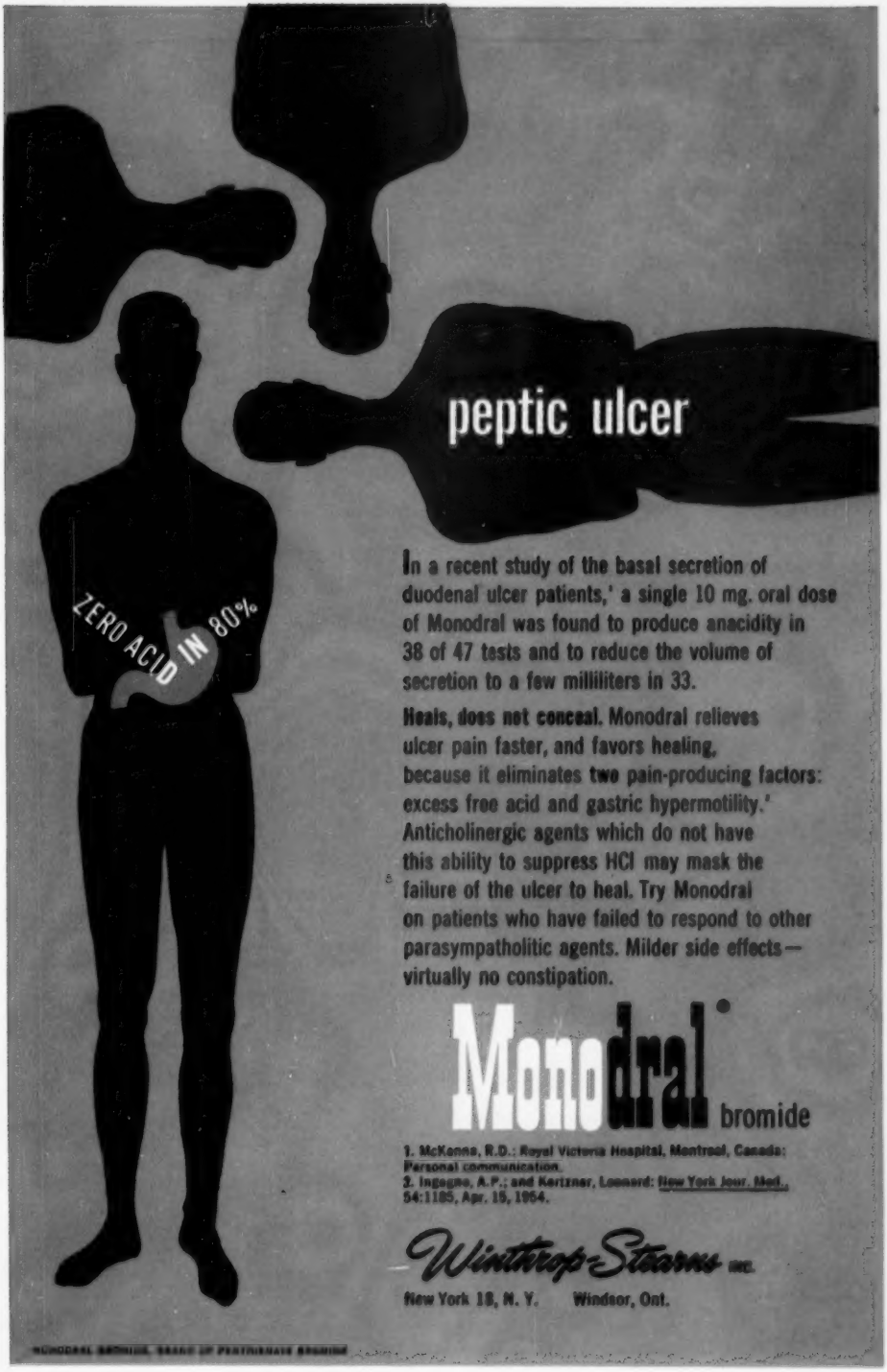

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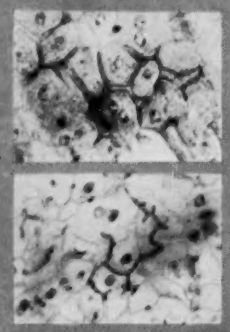

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(1) Clara, M.: Med. Monatsschr. *7*:356, 1953. (2) Brauer, R. W., and Pessotti, R. L.: Science *115*:142, 1952. (3) Schwimmer, D.; Boyd, L. J., and Rubin, S. H.: Bull. New York M. Coll. *16*:102, 1953.

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VOLUME 24 OCTOBER, 1955 NUMBER 4

PANEL DISCUSSION ON THE MANAGEMENT OF GASTRIC ULCER*

FRANCIS W. PRUITT, Col., M.C., U.S.A., *Moderator*†
Washington, D. C.
OWEN H. WANGENSTEEN, M.D.††
Minneapolis, Minn.
ROBERT T. GANTS, Col., M.C., U.S.A.‡
EDDY D. PALMER, Lt. Col., M.C., U.S.A.‡‡
and
IRVING B. BRICK, M.D.§
Washington, D. C.

Col. Francis W. Pruitt, M.C.:—There are those who say that gastric ulcer, to which this panel this afternoon is limited, is a surgical disease, and perhaps it might be well to start off with Dr. Wangensteen and ask him if he would like to discuss diagnosis and healing of gastric ulcer.

Dr. Owen H. Wangensteen:—To have the opportunity of speaking again in this Great Hall, from whose walls the expressive countenances of our Surgeon Generals of the Army of yesteryear look down upon us with meditative forbearance, is a privilege which I shall long remember. Peptic ulcer has probably always been a problem to our Surgeon Generals, though to some of the earlier ones, it may not have been recognized as a distinct entity.

The problem of gastric ulcer is very simple; yet, it is at times a very complicated one. Occasionally, the real problem is to be certain that a gastric

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lesion is present at all. The chief fear that lurks in the minds of most of us is the potential hazard of mistaking a malignant gastric lesion for a benign gastric ulcer.

During these discussions over the past two days, we have heard a lot about peptic ulcer. Most of those discussions, however, have been directed at duodenal ulcer or esophagitis. John Hunter, long years ago, said, "Why doesn't the stomach digest itself?" That is still a very good question. Moreover, a satisfactory answer to that question yet has not been forthcoming. Sir Howard Florey, whose efforts during World War II made the manufacture of penicillin possible, worked on the problem of mucus in the intestinal glands in the decade prior to World War II. Florey found that stimulation of the pelvic parasympathetic nerves resulted in exhausting the supply of mucus within the glands of the colon. In fact, the mucus within those glands was exhausted after a brief period of stimulation.

One of my associates, Enrique Sanchez, and I, a number of years ago, tried to exhaust the mucus in the gastric glands of the dog. We found that by the employment of mucolytic agents and the simultaneous administration of histamine in beeswax, that we could get rid of the velvety carpet of mucus upon the surface of the gastric mucosa. Ninety-six hours of continuous stimulation, however, failed to exhaust the mucus from the crypts of the gastric glands. In other words, one reason why the stomach does not digest itself is because of the great capacity of the gastric glands to secrete mucus. A brief period of stimulation suffices to exhaust the mucus from the esophageal glands. Moreover, the esophagus is lined with squamous epithelium. These two factors cooperate to make the esophagus very susceptible to injury by the digestive juices.

Patients who have gastric ulcers, in the main, do not have as high a concentration of hydrochloric acid as do patients with duodenal ulcer. Gastric ulcer, it would seem therefore, is not a problem of acid-peptic digestion alone. There are probably additional unknown factors which condition the occurrence of gastric ulcer.

We are not recognizing gastric cancer as early as we should. Moreover, an occasional patient with a gastric complaint, who is subsequently found to have a lesion may be found to be negative on roentgen study. We sometimes hear roentgenologists talk very glibly about their near-infallibility, suggesting possibly a touch of the divine quality. These words of praise of the work of roentgenologists would come better from the lips of their fellow specialists than from themselves.

I am inclined to believe that the accuracy of roentgenologists in the recognition of gastric lesions is in the range of 70 per cent rather than 95 per cent, as we occasionally hear from them. I am not indicting the ability of roentgen-

ologists. I am only pointing out some of the shortcomings of roentgen methods. And yet, we have to admit it is the best tool we have. Obviously, we need to pool all our data to the end that the best adjudication of each situation can be made. And in such diagnoses generally, the contribution of the roentgenologist is the most important.

Not infrequently, the recognition of the presence of a gastric lesion, which is often times malignant, depends in large measure on the alertness of the clinician. At the University of Minnesota, where we have one of the best roentgen diagnosticians of the alimentary tract in this country, Dr. Leo G. Rigler, I find myself not infrequently urging upon the roentgenologist the possibility of a gastric cancer when roentgen studies are negative. In other words, current methods of roentgenography occasionally are inadequate to detect the presence of some gastric lesions. A superficial spreading cancer of the gastric mucosa is not infrequently overlooked by the roentgenologist. I have also seen large cancers of the fundus as well as of the anterior gastric wall overlooked by the roentgenologist.

When an achlorhydric patient goes through the clinic and the roentgenologist finds no lesion, and six months or a year later the patient is back, having been seen two or more times because of an abdominal complaint, and ultimately a lesion shows up which is inoperable—it is very evident that someone has been asleep, not alone the roentgenologist, but also the clinician. And mind you this sequence of events happens—yes, unfortunately even in the Out-Patient Clinic at the University of Minnesota.

It is a long time since I made the important discovery that my chief role as a consultant in gastric lesions, is to ask the patient, "Have you had a gastric analysis?" Many patients, who have had many x-ray examinations and even several gastroscopies done, may not have had a gastric analysis. Why this important diagnostic agency is frowned upon so often by internists, I confess I do not understand.

I want to speak briefly, Dr. Pruitt, of the healing of a gastric ulcer, and I am done. A few years ago, Drs. Stanley Friesen, Enrique Sanchez, Lyle Tongen and I treated 13 patients who were found to have a gastric ulcer by roentgen studies. These patients were then placed on a well supervised Sippy regimen. In all instances, the gastric defect disappeared after 3 to 4 weeks of treatment. When no defect could be observed, roentgenographically, gastric resection was done on all 13 patients. One of them proved to have a cancer. Of the other 12, only one was completely healed. It would appear that a peninsula of epithelium grows out to cover the defect, but the defect apparently does not quite become completely covered by gastric epithelium. And inasmuch as a bare area still persists, it is not difficult to understand why gastric ulcer comes back in the very same spot. Recurrence of gastric ulcer after medical management at the same site is an occurrence well known to all of us. Mr. Hermon Taylor

of the London Hospital visited me about the time that a report was being prepared upon these 13 patients. He felt that gastroscopic examination was a better agent with which to determine complete healing of a gastric ulcer. We were anxious to follow his advice; however, it is not nearly as easy to get patients to submit to repeated gastroscopic examinations as to have another roentgen study. Eight years have gone by and we still do not have another series similarly treated who were subjected both to roentgen and gastroscopic examination before resection was undertaken.

I do not defend the thesis that every patient with a gastric ulcer should have an operation. There is a garden variety of ulcer which heals under a brief period of medical management. Our experience, however, with the 13 patients cited above, whose ulcers disappeared on x-ray examination, but in which group one was a cancer, is probably quite representative of what happens generally in the medical management of what would appear to be bona fide gastric ulcers. It is regrettable that the sample was not larger. If one includes also "dubious ulcers" such as Dr. Brick spoke of, as well as gastric ulcers with persistent defects, about which there is no debate concerning a valid indication for operation—when one considers all of these groups, it is understandable that an incidence of cancer is found in approximately 20 per cent of gastric ulcers. It probably should have some pertinence for this discussion that in the Vital Statistics of 1950 a higher mortality is reported for gastric than for duodenal ulcer. Moreover, it should not be forgotten in a discussion such as this that, of the 12 benign ulcers "healed" under medical management, complete mucosal healing had occurred in only one.

Dr. Pruitt:—Thank you, Dr. Wangensteen.

We will pass over to Dr. Brick the next question: "Please discuss the cytological approach to gastric ulcer."

Dr. Irving B. Brick:—These remarks of Dr. Wangensteen may, of course arouse a bit of controversy on the part of some of us who are not in total accord with this business of removing all gastric ulcers willy-nilly, and, as he pointed out, he is not in favor of that either.

There is no question, with reference to the diagnosis, that all of our methods currently are not 100 per cent accurate nor are they in all cases too satisfactory. We know from experience, and all of you who do gastroscopy to any great extent, I am sure, have experienced the same thing, that when the radiologist (after we have followed a benign gastric ulcer and have seen it shrink on x-ray) tells us it has disappeared, if we gastroscope that patient, many times we will see a smaller lesion than we originally saw. Unfortunately and undoubtedly, there are many cases of gastric ulcer, particularly those small gastric ulcers, which are not picked up by x-ray.

Time and time again, following patients with what we believe to be benign gastric ulcer, by serial x-ray and serial gastroscopy, we have noted as a lesion gets smaller, the x-ray tells us there is nothing there. We gastroscope the patient, and, sure enough, we find the lesion healing.

Certainly no one disagrees with the idea that if anyone has any doubt about a patient's having gastric cancer, he should have that patient operated upon. We do not, however, feel that every gastric ulcer necessitates surgery.

I do not think cytological technics offer very much in the diagnosis of gastric ulcer. With reference to gastric cancer, in our experience it has not been too helpful. I am talking now about a gastric lesion by x-ray. An ulcer is diagnosed by x-ray and the roentgenologist says he cannot rule out cancer, and most roentgenologists tell you that when they see a gastric lesion.

In our experience with reference to trying to determine cytologically whether a gastric ulcer is benign or malignant, our results have not been too outstanding, nor have the results of people who have made deeper study than we have of this particular problem. Unfortunately, it has been found even in cytological clinics as good as Dr. Papanicoloau's, that when there is obvious gastric cancer, and there is no question about the diagnosis by x-ray, and the man comes to surgery and it is proved by histologic study, even in those obvious cases, many times the cytological studies are quite negative.

We feel that cytologic study of the stomach may be in its advent, but when you attempt to do cytological study, in the first place, you have to have someone extremely interested in this problem. After all, this is not new technic. Tomenius for many years has been discussing and talking about gastric sediments and the cytological study of gastric sediment. He pointed out many years ago it is very difficult to make a diagnosis of gastric cancer from cytologic study, even where there is a gastric cancer present.

Certainly the thing we are talking about this afternoon is not specifically gastric cancer, but rather gastric ulcer, and certainly in that particular phase of the problem, cytologic study does not afford us a great deal of information. If we get a negative answer from one, two, or three cytologic specimens, we still cannot be sure that we are not dealing with a cancer. If one takes it in conjunction with the clinical course, x-ray study, and gastroscopic study, I certainly think that it might have a limited field of usefulness.

With reference to gastric secretory studies, mentioned by Dr. Wangensteen, I am surely in hearty accord with the fact that that should be done in all cases where there is a gastric lesion. Gastric study of the acid-secreting portion of the stomach has been so deflated that I think we have got to go back and do more of them. Many times I make rounds and find that the interns and residents, knowing that there is a gastric ulcer by x-ray, have not gotten a gastric acidity, and do not know what is actually the value of gastric

acidity. When you have a gastric lesion diagnosed by gastroscopy or by x-ray, I believe that it is of some importance, but, again, it is an isolated fact that has to be fitted in with the clinical picture. Certainly if you have high acid or normal acid, you feel a bit more comforted that this probably is not a cancer, and if you have achlorhydria, or a very low acid, you also are a bit more suspicious that you had better be careful about what you finally say about this lesion, but, again, as Dr. Wangensteen said, this is but an isolated fact in the study of these gastric lesions.

Dr. Pruitt:—Dr. Palmer, would you like to say anything further on this subject, particularly with reference to the brush technic?

Lt. Col. Eddy D. Palmer, M.C.:—In our groping about, as clinicians, for better ways to detect and identify isolated gastric lesions, I am sure it is only natural that our previous training with diseases in other organs pushes us into making every effort to utilize all histopathic and cytologic technics.

We have had no experience with the Ayer brush for collecting samples of cells from the stomach, but those who have indicate that the brush is an instrument which permits the histologist or the cytologist to obtain an optimum amount of cellular tissue on the slide, and cellular tissue which is in as good a state of preservation for examination as any technic provides. For that reason, certainly the brush technic should be considered an advancement in the diagnostic cytology of stomach lesions.

This technic, however, as Dr. Brick has pointed out, even pushed to its own limit, can be no more than a complementary diagnostic technic, to be combined first of all with the clinical examination of the patient, and then the ancillary technics, radioscopic and endoscopic.

Dr. Pruitt:—Thank you, Dr. Palmer, and, while we have you there, would you like to comment on the accuracy of gastroscopy in the diagnosis of gastric ulcer?

Dr. Palmer:—In this problem, it is only natural that the clinician should be fascinated by the endoscopic technic. Certainly he well knows that the endoscopist is fascinated by it all, with his instrument and with the pictures he sees and, unfortunately, with what he considers to be his diagnostic accuracy.

Gastroscopy is a mighty poor technic when compared with some of our clinical technics, say, for instance, the Wassermann test. It is certainly just a terrible technic when compared with histologic examination of a biopsy taken directly from a tumor. When compared, however, with roentgenologic technics, and certainly when compared with cytologic technics, it measures up rather well, and we have not reached the point yet where we can afford to discard gastroscopy as being too inaccurate to be helpful.

It has become rather trite to say so, but it is worthwhile repeating again and again that the gastroscopist offers information which is only complementary to that of the radiologist, and the opinions of both examiners must be correlated and translated by the clinician.

Dr. Pruitt:—Perhaps it would be well to pass on now. We have spent some time on diagnosis. I believe all members of the panel are in agreement that multiple procedures should be used in the diagnosis of gastric ulcer, not only gastroscopy and radiology, but a repeat of those procedures where there is question, or whether there is doubt.

We now go on to treatment, and, Dr. Brick, again would you please discuss the conservative treatment of gastric ulcer?

Dr. Brick:—There are many physicians, and particularly surgeons, who believe there is no such thing as conservative treatment of gastric ulcer. I think that the criteria for such treatment, first of all, depend upon what we believe to be the diagnosis. We cannot escape the fact that the only serious problem in the uncomplicated gastric ulcer—and I am leaving out bleeding, perforation, and obstruction—the only real problem that faces all of us is whether or not we are dealing with a benign lesion or a cancerous lesion.

Now, when a cancer is diagnosed, or the x-ray findings, and clinical picture, and gastroscopy are such that there is even the slightest question that this is a cancer, we advise surgery. There are no two ways about that. But, in the case where you have a gastric lesion and the criteria for diagnosis are such that they make you believe that there is a gastric ulcer—and, of course, all of our technics are liable to error, as has been pointed out—then we believe you should go ahead on a provisional basis to treat these patients.

Anyone who undertakes the responsibility of treating a gastric ulcer medically has a rather profound responsibility to follow that patient, in my opinion, at least for a year.

The question arises about treating these patients, and there is no trick to the treatment of these patients with reference to medication because you treat them the same as you would with any other peptic ulcer, if you believe you are treating a benign lesion. The problem arises as to how long should you treat them, or do you treat them any length of time before surgery should be done.

I don't believe for a minute it matters whether you wait four weeks or six weeks. I say that rather dogmatically and I am not a dogmatic person, because one of the things many of our surgical confrères have overlooked in advocating prompt and immediate surgery for gastric lesions, whether they are benign or not, but in the suspicion that they are not benign, is that the time and duration of symptoms really does not matter when it comes to the prognosis

for five-year cures. On the contrary, it has been found by many studies—and this has been reported in summary in a paper that appeared in Surg., Gynec. & Obst. in February 1954—that patients with gastric carcinoma who have symptoms a longer period of time when they first see the doctor, are more likely to have a five-year cure when resected, than patients who have symptoms a shorter period of time. For instance, at the Mayo Clinic, Priestly and his colleagues studied a group of 34 patients who had lived for five years after gastric resection for carcinoma, and they studied a very similar group of 34 patients who had died within a year after resection for gastric carcinoma, and these cases clinically were pretty much the same. They found that the patients who survived five years had symptoms 16 months prior to their surgery, whereas the patients who died within a year had symptoms for only five months.

I think we have to be realistic about information like that and not be frightened into too much unnecessary surgery because a surgeon tells us, "If you wait a month, this patient is going to have a poorer chance." I am talking now about gastric lesions that we believe to be benign, and we know that possibly there might be a 10 per cent error.

Therefore, in the management of these patients in whom there is no doubt about a cancer being present from the beginning, we feel that a period of four to six weeks of careful treatment with antispasmodics, sedation, and possibly dietary management, though I personally think that that is not very important, and very careful follow-up, is preferable. It is preferable to have these pateints in bed in a hospital, but I think that is not always practicable to do that. If, after a period of four to six weeks, there is good healing by x-ray and by gastroscopy—if we can see the lesion by gastroscopy—that affords a great deal of good information on this particular problem—then we can feel that we can follow that patient a little longer, but we must not say to that patient that he is cured. I think after the six-week period, when we make up our mind as to whether immediate surgery is needed or not, we still have to hold onto that patient for at least three to six months more, following him up, possibly now on an ambulatory basis, and determining whether or not there has been any recurrence or any deterioration in the patient's condition.

The point that I am making, though, with reference to this business of early surgery, as something that the surgeons are going to have to explain to me personally a lot better than has been explained in the past, is this business of why—what difference does it make, let's say, whether you wait four to six weeks in a patient you are not sure about, if, after all, on resection of these patients, it does appear that the patients who have symptoms longer, survive better after the operation. It is a paradox that I think goes to the root of the mystery of what gastric carcinoma is.

Dr. Pruitt:—Thank you, Dr. Brick.

We are not intending to skip the surgeons, though we have them outnumbered a bit, but there is one more question to Dr. Palmer, and that is: How long do you feel patients with what you feel is a benign ulcer, should be carried on a medical regime, and what about relapses under medical management?

Dr. Palmer:—I think that it is the responsibility of the patient's doctor to make the decision about the nature of a gastric lesion immediately, as soon as he feels he has all the information that he will need, and I do not think that it is either fair or particularly useful to wait a period of time to see what happens to a lesion.

Speaking now of medical treatment, may I tell a story? It is true.

Speaking for myself personally, I have talked myself out of treating patients with benign ulcers with anything but interview technic. I am pretty sure that diet does not make very much difference to an ulcer patient. I think acid does not have much to do with forming or aggravating ulcers. I do not use antacids or antispasmodics and I think patients with uncomplicated gastric ulcers should not be operated on.

I hope some of you know Dr. Tage Christiansen, of Copenhagen. I am sure some of you do. Several years ago we used an "ulcer capsule" here at Walter Reed. It was a large capsule and contained everything the ulcer patient is supposed to need. It was a complicated affair pharmaceutically and hard for the patient to swallow, but symptomatically the patients did very well with it. All you had to do was hospitalize an ulcer patient, put him on ulcer capsules, and he got better.

Dr. Christiansen came to visit us once, and it happened to be at the time when the detergent toothpastes were being popularized for ulcer therapy, the sodium alkyls, and Teel. All ulcer patients, you remember, were urged to drink Teel. Dr. Christiansen was aghast at our ulcer capsule, and threw up his hands and said, "I think if you treat your ulcer patients with pancakes and shaving cream, they will do just as well as they do with these fancy and expensive ulcer capsules."

There wasn't anything for us to do but take our next 20 ulcer patients and treat them with pancakes and shaving cream, and we did, plus water—water, pancakes, and shaving cream—and you never saw a happier lot of ulcer patients. These patients healed their ulcers just as quickly, by roentgenologic criteria, as our ulcer patients who were being treated with ulcer capsules. (*Laughter and applause*)

Dr. Pruitt:—Things are beginning to warm up a little bit now, and I guess we could use laundry detergent and treat our ulcers and inactivate pepsin, but we do not have anything with which to digest our proteins.

We have a lot of surgical talent around here. Dr. Gants, what do you feel is the ideal mortality rate in surgery for gastric ulcer?

Col. Robert T. Gants, M.C.:—I would say that the ideal mortality rate in resection for gastric ulcer would be zero. From what is reported in the literature, the ideal rate is one to two to three per cent. At our institution, I am sorry to state that in the operative treatment of gastric ulcer, that is, resection, in the past year the mortality rate has been five per cent. We have operated upon 20 patients. One died as the result of peripheral vascular complications. Even though he did die of a pulmonary embolism, death was the result of our surgery

I should like to make additional comments about this business of gastric ulcer and gastric cancer. From the talk that has been going back and forth here, we have discovered that there is no accurate method of diagnosing early gastric malignancy. Apparently there are no pathognomonic signs of early gastric malignancy. By the time the patient develops such signs or symptoms, it is too late.

Dr. Pruitt:—Dr. Gants, what do you believe are the indications for surgery in gastric ulcer?

In answer to my colleague here on the right, I believe that he does not quite understand the surgeon's problem. Our problem is to do surgery at the time we can do some good for the patient; in other words, I do not think it is a case of total gastrectomy on every patient. The ideal treatment for cancer is to operate soon enough to totally remove the malignancy before there are metastases, or better still, to remove the lesion before malignancy develops.

You can construe statistics so that you get almost any result that you want. The duration of symptoms, I believe, has too little to do with it because many ulcers are silent for a period of as long as two years, therefore you cannot accurately judge the time interval or the duration of the presence of the lesion from the time the symptoms start. For example, there is a well known case of a young man coming into our hospital with a perforated gastric or duodenal ulcer. He has had no previous symptoms and now he has a perforation. Everyone is quite surprised because the man had no previous symptoms. This is a common occurrence.

Now, in getting back to the basic thing, the surgeon's problem is to treat the patient with gastric ulcer or gastric cancer as early as possible—that is, before the cancer has spread to the lymph nodes. I do not think that you can tell by any statistics or by the length of time of duration of symptoms, how long the lesion has been present. Until we find a better way of making a diagnosis of gastric cancer, I believe that the surgeon is going to have to operate upon some benign lesions.

Dr. Pruitt:—I am sure Dr. Wangensteen has much of helpful information to give us on this subject, particularly indications for surgical intervention.

Dr. Wangensteen:—I am still troubled over the clouded atmosphere prevailing here today hedging about the problem of curability of gastric cancer. Dr. Pruitt, I hope you will ask Dr. Brick to say publicly here today that he does believe in operation for cancer—and in operation without delay.

Dr. Pruitt:—We will get to him next.

Dr. Wangensteen:—I hope no one will go away from this panel discussion believing that a little delay will contribute anything to bettering the score in gastric cancer. I cannot hear Dr. Brick or anyone else imply or state that delay is defensible, in gastric cancer. In fact, as a surgeon, I cannot hear someone say that without taking very serious issue with him. Had Dr. Brick said "an out-and-out ulcer", I would agree with him, but he spoke of "the dubious ulcer". I would say the dubious ulcer is the one that should go to the surgeon without delay. We cannot possibly cure gastric cancer by a milk regimen.

Now, with reference to indications for operation, they will undoubtedly vary somewhat with the individual outlining them. We are, of course, very fallible people. We cannot make 100 per cent correct decisions in anything, let alone determining whether or not a patient with a demonstrated gastric lesion has a gastric ulcer or a gastric cancer—that is, without the help of the microscope.

At the Lahey Clinic, and this observation has been supported by other clinics, they report an incidence of "gastric cancer of 18 per cent" in gastric lesions which were believed to be benign or had been treated for a period as benign lesions. The microscope must remain as the ultimate arbiter. In fact, there would appear to be some suggestion of truth in the declaration made by Wilson and MacCarty of Rochester, Minnesota about 40 years ago when they stated that ulcers of the stomach were frequently cancerous. Today, it is admitted that the development of a cancer in a benign gastric ulcer is probably not a frequent occurrence. At the same time, however, it is very easy to mistake a gastric cancer for a benign lesion—so much so that it is best to refer patients for surgery unless the lesion is completely healed within three weeks. Patients who are achlorhydric should be referred for operation at once, for such lesions are almost invariably malignant.

Any patient in whom there is a 5 per cent chance that his lesion is not benign, such a patient in his own interests should be advised to accept operation to resolve the dilemma of whether or not a cancer is present. I agree, however, with the suggestion that there are gastric ulcers of the garden variety, not the hothouse type which can be identified as benign. In any patient concerning whom there may be some question concerning the nature of the lesion, how-

ever, I must confess that it bothers me that anyone on this panel could suggest procrastination in such a situation. Such patients should go to surgery, and without delay. We are never going to cure gastric cancer by treating such patients with delay or by a Sippy diet.

I thought my medical colleague, Dr. Palmer here, was a composed, seasoned and a rational person, but he would have us believe that he is a complete therapeutic nihilist when it comes to the management of gastric cancer.

Milk as Sippy (1915) suggested and Cruveilhier (1856) said long years before—is a wonderful agent in the treatment of peptic ulcer. I only wish internists would not attempt to get patients with peptic ulcer so fat. They ought to get a little better acquainted with skim milk. After all, it is the protein in the milk which combines with the acid. It is not the fat in the milk that controls gastric acidity. Moreover, patients will drink more skim than whole milk. Why give any patients half milk and half cream as Sippy advised? Certainly in 1954, that absurd practice should be stopped.

Dr. Wilson, your question is probably not susceptible of a very direct answer. I would say first, however, that the physician always does well to entertain the suspicion that his patient may have a cancer. That may not be so bizarre a statement as one might think. Each year in our Clinic we see many patients in whom we virtually coax the roentgenologist into making a diagnosis of gastric cancer. I see patients in our Out-Patient Clinic once a week, on Tuesday mornings. Many patients come with x-rays of their stomachs in their hands—some from a long distance. In the typical lesion, of course, one can superimpose the defect in all films. Not infrequently, one sees a patient with six films, in five of which there is a constant and a persistent defect. In the sixth film, the defect is not the same. Roentgenologists have been accustomed to label such situations as essentially spastic in nature. A few such lesions in my experience have proved to be malignant. All such patients, when achlorhydric, should be explored. Within the past few months, I have seen one such patient with a high degree of free hydrochloric acid in his stomach. The roentgenologists repeatedly diagnosed the situation as a spastic pylorus. At operation, a spreading, superficial gastric cancer with positive lymph nodes was found. The roentgenologists, I feel, need to give more careful study to the defects which are not superimposable on all films. Some of these are cancerous lesions. The roentgenologists need to revise some of their criteria of diagnosis, I feel. I would, however, lend emphasis to the importance of pooling our data. If a patient is achlorhydric and has symptoms and the roentgen study is negative, gastroscopy should be carried out. If still no objective findings are in evidence, I favor exploration. Drs. A. Ochsner and Blalock (1953) advocated exploration in cases in which there were symptoms but no objective findings. I agree with that thesis. In fact, we too have uncovered cases of gastric cancer following that lead.

So I would say that in addition to advising surgery for a bona fide gastric ulcer which has failed to respond to a dietary regimen not to exceed three weeks in length; that operation is to be advised also in every gastric defect in which achlorhydria is present; for the gastric defect, over which the roentgenologist has the slightest misgiving lest it might be a cancer, I believe immediate resort should be had to operation. Then finally, there is the occasional case in which there are no findings, but the patients have symptoms, including pain. Such patients, I believe, should be explored. And in my experience this indication for operation will result in uncovering an occasional gastric cancer. Each year in our Clinic, we see patients who have been coming to the Clinic for a year or more complaining of abdominal pain—and occasionally such patients are achlorhydric too. Exploration was not advised until objective findings appeared. And at operation, hopeless cancers were found. That obviously is not good medicine.

Dr. Pruitt:—Thank you, Dr. Wangensteen. Would I be correct in stating that perhaps you would like to include recurrences and intractability as indications for surgery, as well?

Dr. Wangensteen:—Yes.

Dr. Pruitt:—Dr. Brick has been sitting here impatiently.

Dr. Brick:—I think in the statements I made, Dr. Wangensteen, I specifically said that if there is a dubious lesion, it is turned over to the surgeon. My conservative management has to do only with those lesions that we believe to be benign gastric ulcers. I want to clear that up.

I think there is unanimity of opinion by myself, and Dr. Palmer, with the other members of this panel, that if it is a dubious lesion, certainly it should be operated upon without delay; however, the dilemma of this lag in symptomatology cannot be explained away by saying that we cannot always tell about the lesion, even when the pathologist holds it. We know that is true. We know that there is something to biologic predetermination as to what these lesions are going to do and not going to do.

With reference to gastric cancer, I am sure Dr. Wangensteen remembers the paper he wrote many years ago about famous surgeons and specialists in gastric cancer who died of gastric cancer. I remember that paper very well. I always do remember that paper when this subject comes up, because I am sure some of those doctors had lesions that were gastric ulcers by x-ray, that possibly were not diagnosed as gastric cancer at that time. Dr. Wangensteen correctly pointed out how important it is that we have early diagnosis, and if a group of doctors interested in gastric cancer cannot make an early diagnosis of their own symptoms, it seems that there is more to this problem of gastric cancer than anything we have arrived at at the present time.

We have to admit that all of our diagnostic technics, all of our evaluation methods, are inadequate, and I think everything indicates that a lot more work has to be done on this particular subject.

I do not want Dr. Wangensteen to think I am a nihilist with reference to surgeons and with reference to these lesions. I turn them over as soon as there is any doubt in my mind. We do not go on the assumption that they are benign, Dr. Wangensteen, but that is the lesion we follow and are careful and cautious about for some six months to a year, and I think it is a great responsibility. When we have a patient with a gastric lesion, we are going to follow him if we treat him medically. It is our responsibility to see that the follow-up is done, and the patient is not lost sight of for at least a year.

I hope that clarifies my situation.

Dr. Wangensteen:—I like this statement the best.

Dr. Pruitt:—Perhaps we should move along. Questions are coming in a bit more rapidly now.

Here is a question directed to Dr. Snapper. One member would like to hear from him on the treatment of gastric ulcer by no diet and no medication. Would Dr. Snapper favor us with a reply, please

Dr. I. Snapper:—It is much more interesting to sit in the audience and listen than to stand on the platform and speak. Until now all the speakers have presented opposite opinions and as far as my opinion goes, everybody is right!

Dr. Brick, can certainly defend the thesis that in many cases a moderate delay of the operation of carcinoma of the stomach does not seem too important.

At Presbyterian Hospital and later at Memorial Hospital, both in New York, a gastrointestinal series was performed on all healthy visitors. Several cancers of the stomach were discovered among these visitors who had no complaints at all. As far as is known the surgical results were not better in these patients than in patients with carcinoma of the stomach who had complained for some time.

Dr. Wangensteen is just as right. Dr. Pack tells us that of all cases of ulcer which seem benign to the physician, to the gastroscopist, to the roentgenologist, and to the surgeon at gross inspection, 55 per cent are still malignant at microscopic examination. Thus, Dr. Wangensteen is right when he says all ulcers of the stomach have to be operated on.

Dr. Palmer said there is no treatment of ulcer of the stomach. This perhaps should be qualified. Private patients who can modify their way of living as ulcer treatment requires, often react upon medical treatment.

With other words, patients with gastric ulcers who can rest in case they do not feel well, who are willing to give up smoking, to restrict their alcohol

intake, to eat five meals per day, to follow a strict diet, to take antispasmodics, alkalis and bismuth, can usually have a satisfactory existence without operation.

But ward patients who are not in a position to put their ulcers in the center of their existence, do not do well on medical treatment.

Dr. Pruitt:—Thank you, Dr. Snapper.

I think we would all agree that after all those diplomatic remarks, Dr. Snapper should be in the Diplomatic Corps.

We have touched the question of treatment. I should like to add this one: What is the diagnostic value of the presence of lactic acid in gastric contents?

Dr. Palmer:—Dr. Snapper has made me feel so friendly with the rest here that I don't know how to answer some of these.

I have never seen a case of gastric cancer cured.

I have not seen one cured by the psychiatrist or by the surgeon, either, and I thoroughly distrust much of the written statistical experience on this subject, such as we are all familiar with in the current literature. I have read the reports which tell of 30 per cent five-year survivals, but I also know that in many institutions "carcinoma" at times means simple polyp of the stomach, and so on and so forth. I believe that one of the worst snares and most dangerous delusions being foisted on the profession today takes the shape of the IBM machine and the attempt at statistical analysis of the gastric problem.

I will tell Dr. Wangensteen that I can't see why cancer of the stomach should be considered a surgical problem, and I do not think a patient with cancer of the stomach should be operated upon unless there is a complication, such as obstruction.

The next question is: Have anticholinergic substances altered the healing time of gastric ulcers? I do not know. I do not know how one can evaluate the effectiveness of the different types of medicine we use for ulcer. I would bet the anticholinergic substances are no better than pancakes and shaving cream.

Dr. Pruitt:—We have two more questions on diagnosis.

Dr. Brick, compare your treatment of greater curvature ulcers, antral ulcers, fundal ulcers, and ulcers of the cardia.

Dr. Brick:—Well, possibly this might make Dr. Wangensteen have a different opinion of me. I do not treat medically greater curvature ulcers. They are all surgical so far as I am concerned. I say that from our own personal experiences and the experience of many other authorities, and I do not claim to be an authority. I am sure you have read case reports about greater curvature lesions being benign. It is true, and you see them increasingly in the

recent literature, but the percentage, whether you call it 70, or 60 to 90 per cent, that are malignant, is high.

I play the odds on many things, and that is one situation in which I play the odds. I go ahead and turn them over to the surgeon, once they are diagnosed by the x-ray man. I may even look at them gastroscopically just to see them, but I do not attempt to make any differential diagnosis when they are on the greater curvature. It is a surgical problem. That type of gastric ulcer is per se, benign or malignant, surgical no if's and and's on that.

With reference to the locations and sites as to gastric ulcer, I cannot compare the treatment statistically or in any other way. In my experience it does not matter much about the location as to whether they are going to do well or not do well.

I had hopes that Dr. Palmer would have by now discussed the significance of the different locations of the ulcers, as Colonel Pruitt intended him to, but we got off the subject, so possibly when it gets over to Dr. Palmer, we will let him discuss what the significance of these locations is.

Dr. Pruitt:—One other question: Is there such a thing as malignant degeneration in the wall of a benign ulcer?

Dr. Brick:—That is a question that concerns and bothers all of us. I am not dogmatic about that at all, because I do not know, and I am frank to admit I do not know. I have read the literature and tried to keep up with it, on whether or not a chronic gastric ulcer, which we all consider benign, and which one follows for many years, as I am sure Dr. Wangensteen has followed many—whether or not that thing ever does become malignant. There are several good case reports indicating that this is so, and I think all one can say on the subject, from the literature, is that if it does occur, it must occur quite infrequently.

Dr. Gants, in discussing this, indicated you should get patients before it becomes a cancer. He must have some better information on this problem than I have, because I have not been able to find case reports in which it is claimed that benign gastric ulcers have become malignant. Some surgeons have noted the infrequency of such a malignant lesion. I should like to hear from other surgeons on this because I think it is a really important question.

It it can be shown that these lesions degenerate in years, I would be the first to come out and say every gastric lesion should be gastrectomized or excised.

Dr. Pruitt:—Dr. Gants, would you care to comment on that as well as the two questions directed to you?

Dr. Gants:—I did not quite mean waiting for the gastric ulcer to degenerate into a malignant ulcer.

In reply to Dr. Brick, I would state that about five or six per cent of gastric ulcers can become malignant. How authors who make reports of these ulcers developing into malignancy, prove that they do, I do not know. First of all, let us say a man comes to us with an ulcer diagnosed very, very early. We operate upon him immediately and find that he does have a small malignancy. All we have done is a subtotal resection, but we have taken out quite a bit of the surrounding structures or tissue, especially the gastrohepatic ligament and the regional lymph nodes. The pathological examination of tissue reveals no lymph node involvement. This patient has been treated adequately from a surgical standpoint.

I cannot agree, therefore, with Dr. Palmer (I do not, many times, anyway). I especially cannot agree with him in his statement that there is no treatment for gastric malignancy except to treat the complications. In view of what I have just said and because I am certain that there are cases which have been cured, it is impossible for me to agree with his statement. The treatment of such cases is a surgical problem and it is the surgeon's goal to remove a lesion which might become malignant or an early malignant lesion before it has spread. I do not see how you are going to do it unless you operate upon these patients and perform the operation very early.

I cannot answer the question very well as to how long the symptoms have been there or how long they have been present without being discovered. If you are going to accept the thesis that these patients will be cured by surgery, I think you are going to have to remove some benign ulcers.

Someone has asked me a question here: Is the surgical exploration and the frozen section technic adequate in the final diagnosis of gastric ulcer?

I believe that question should be directed to a pathologist. I once had such a patient, a patient with an ulcer on the lesser curvature of the stomach, by the way. It was thought to be benign on frozen section and even on eventual paraffin sections. I told this man's wife that I did not think the lesion was malignant. About six weeks later, after careful review of the material, some mitotic figures were found. That patient lived three years. So you see you cannot always tell, even when you have the services of a pathologist. I do not want to give the impression that I do not believe in the pathologist. I simply mean to cite a case where we just could not tell. I would state that 98 per cent of the time we can tell. You have to depend upon your pathologist. You cannot disregard him and make your own diagnosis, so we generally utilize that technic.

Perhaps if all of us who had something to do with this patient had to tell his family that he had a malignancy at the termination of surgery, as does the surgeon, there would be more of a tendency to do early surgery on these patients.

Dr. Pruitt:—We had some questions directed to Dr. Wangensteen, if we can call on him.

Dr. Wangensteen:—I must admit to an element of surprise to hear in this Great Hall that a Staff member of the Walter Reed Hospital doubts that cancer can be cured. I thought that species of Doubting Thomas was extinct.

When I became chairman of the Department of Surgery at the University of Minnesota, in 1930, there were then no instances of five-year cures of cancer of the stomach on the records of the hospital; however, during the intervening years there have been more than a hundred.*

Dr. Palmer, you must have had the unfortunate circumstance of having been identified with a number of poor surgeons. I must insist, however, they are not here, because I know something of the character of surgery done in this institution. In fact, your cynicism over the curability of gastric cancer troubles me, as it must your colleagues too.

When Livingston and Pack published their monograph in 1939, they spoke of an over all five-year cure rate of gastric cancer of 2 to 3 per cent. "Grade I" gastric cancers in our institution are called benign polyps and are not listed amongst the cancers. We published some years ago an over all five-year survival rate for gastric cancers of 12.2 per cent. That figure has remained at that level. I had hoped that it would come up with important emphasis being given to early diagnosis and with the performance of more radical surgery.

There is, of course, a big disparity in performance with reference to cure between the lymph node positive and the lymph node negative cases. Every surgeon's experience teaches that. Over the 14-year interval between 1936 and 1949, the five-year survival rate in patients undergoing resection in whom the lymph nodes were positive for cancer was 16.9 per cent. Dr. Donald Shahon and his collaborators in our group find that the five-year survival rate in the lymph node negative group is 55.2 per cent. As I have had the opportunity to say earlier during the course of this meeting, however, more thorough dissection is making its influence felt in bettering the accomplishment. I would look particularly to great improvement in the lymph node negative group.

The studies of my colleague, Dr. Stuart Arhelger, on the sites of the residuals in the "Second-look" operations in the lymph node positive group of gastric cancers are teaching important lessons. It came as quite a surprise to all of us to find in these "Second-Look" procedures that, the most common

*One hundred nine patients who underwent gastric resection for gastric malignancies in our Surgical Clinic survived 5 years or more. Of these, 104 had carcinomas; 3 had lymphosarcomas and 2 leiomyosarcomas. Of these 109 patients, 73 survived operation 5 to 10 years; 33 after 10 to 15 years following operation and 3 from 15 to 20 years.

site for residuals was in the portal triad—a circumstance which has led to including that neglected area in the primary dissection. In this Clinic, the celiac artery, the hepatic artery and the portal vein have been laid bare routinely in gastric cancer operations over the past 6 years. Only within the past year, however, and as a result of these studies, have we commenced to include routinely the posterior border of the duodenum, the cystic and the common bile ducts in the original dissection.

The second most common site of the residuals in "Second-look" procedures done for gastric cancer has been along the superior border of the pancreas; in consequence we sacrifice the body of the pancreas distal to grossly positive lymph nodes in the primary operation. Morever, total gastrectomy is more frequently done in cancer of the stomach than it was five years ago.

It is true that the cure rate in cancer of the stomach is not what it should be, but I submit if we could diagnose gastric cancer earlier—and let us all pray that we will soon have some better method of recognizing visceral cancer earlier than current methods permit us to do. We need efficient organ scrutiny tests which will lessen the arduous labors of Cancer Detection Centers in the finding of cancers in asymptomatic people who are approaching the 5th decade of life.

A question I have here is: "What is the survival rate in patients untreated?" It is definitely under a year after the diagnosis is made—probably in the area of three months.

Another question: "If fear of malignancy is a reason for surgery for gastric ulcer, should the surgical approach be that of a cancer procedure?"

If the surgeon has the faintest suspicion at operation that the lesion may be a cancer, he should most certainly do a cancer operation, including removal of the regional lymph nodes. A frozen section during operation, though not infallible, is very helpful.

Another question: "Surgical treatment for high (juxta-esophagus) benign ulcer, in whom total gastrectomy would be the only method of excision, and in whom, because of risk, this operation seems unwarranted—what manner of operation would you employ?"

It is a good question, a theoretical question, however, because at operation I find that one cannot tell definitely whether one is dealing with a benign or a malignant lesion. A German surgeon Madlener by name, long years ago suggested leaving the ulcer and resecting the stomach beyond the juxta-esophageal lying ulcer on the lesser curvature. This is essentially what is done oftentimes in duodenal ulcer. I have not followed that suggestion, feeling that it is not a good place to leave a gastric cancer. One can excise all the lesser curvature,

doing a 90 to 95 per cent resection. More often, however, I do a segmental resection, leaving the antrum to which the proximal segment is anastomosed. If the frozen section shows cancer, obviously total gastrectomy is in order.

Here we were all going to stick strictly in this discussion to the problem of gastric ulcer, but, you see, fear lurks in all our minds lest we be dealing with a gastric cancer. When one starts to discuss the question of gastric ulcer, one inevitably finds it necessary to say something of gastric cancer.

I hope that this meeting will not adjourn on a note of despair concerning gastric cancer. If Dr. Snapper will go to the New York Academy of Medicine next Thursday evening, he will hear me report on the results of treating gastric cancer in our Clinic. We need obviously to give much more attention to diagnosis. That is the area from which improvement is largely to be expected. My associate, Dr. Claude Hitchcock, who is in charge of our Cancer Detection Center, finds an important difference in survival in patients found to have cancer while under scrutiny there. There is an important difference in accomplishment, both in gastric and in rectal and colic cancers in the asymptomatic cancers, contrasted with that group studied there which are found to have symptoms.

Dr. Pruitt:—While we have you on the subject, there is one further question: Are there any known series of primary stump carcinomas of resected stomachs, such as occurs in stump carcinoma of the cervix?

Dr. Wangensteen:—I don't quite understand the question.

Dr. Pruitt:—I was a little lost myself.

Question:—What I am wondering about is, in removing acid pepsin factors, are we worried in some cases as to whether gastric ulcers are followed by carcinoma. If we have a series of subtotal resections, 10 years later, or 20 years later, might there be some carcinoma. I wonder if that is so.

Dr. Wangensteen:—In duodenal ulcer, as far as I know, there is little likelihood of gastric cancer following gastric resection; in gastric ulcer, however, I am inclined to believe there may be a small risk of gastric cancer occurring in the residual gastric pouch. Certainly, when gastrojejunostomy is done for gastric ulcer, gastric cancer is observed now and then in the stomach. Several such cases have been seen in our clinic. It is in subtotal resection for gastric polyps that we see this recurrence most frequently. Polyps or cancer may be observed in the residual pouch—both which occurrences I have observed.

Dr. Brick:—There have been some series reported of patients operated on with gastroenterostomy for duodenal ulcer, and many years subsequently they have developed gastric cancer. There was a series from the Mayo Clinic not long ago.

With reference to gastric resection for gastric ulcer, followed by cancer, I know of no such reported series, but would agree with Dr. Wangensteen, when it occurs, it is of no greater incidence than in the hospital population.

I think Dr. Gants wanted to say something.

Dr. Gants:—I did not want to talk on the same subject but elaborate a little more on the question given to me about frozen section technic and the use of the pathologist. I am afraid I gave the impression that I don't believe in the pathologist. I simply meant to cite one case where we just could not tell. I would say 98 per cent of the time we can tell, and you have to depend on your pathologist. You cannot disregard him and make your own diagnosis. So we generally utilize that technic.

Dr. Pruitt:—Now, from the audience: In support of Dr. Palmer, let us recall those doctors who discover they have carcinoma of the stomach and immediately refuse surgical care.

Dr. Brick:—Let Dr. Wangensteen talk about that. He wrote the paper. (*Laughter*)

Dr. Pruitt:—Before the panel adjourns, I wonder if Dr. Palmer wouldn't like to say something on the location of gastric ulcer.

Dr. Palmer:—The most interesting recent thing, to me, about location of gastric ulcer has been the plethora of papers about benign ulcers of the greater curvature. Anyone who ever read a book knows that is not supposed to happen, and yet at this hospital, in our last hundred cases of gastric ulcer which were resected in spite of some of us (*laughter*), 10 per cent of our benign ulcers occurred precisely on the greater curvature of the stomach, as the greater curvature is profiled in the anterior-posterior roentgenologic projection. We know that anatomically this is not exactly the greater curvature, but it is the best we can do clinically. Ten per cent occurred there.

The only way that I know of to think of ulcer location in terms of possible malignancy or benignancy, is to pay very little attention to it. Of all the characteristics we pin our hopes on in making the differentiation both roentgenologically and endoscopically, I wonder if location is not the least important.

Dr. Pruitt:—Dr. Wangensteen, as our guest of honor, I wonder if you would like to make some comment before we close.

Dr Wangensteen:—Dr. Brick suggests I say something about gastric cancer surgery. I would repeat here that ascertainment of whether the patient is achlorhydric to histamine is a test which has been very helpful to us. The large superficial spreading cancerous ulcer which you see in this slide was identified in that manner. This patient is an important citizen in our area.

He went to his personal physician, who had the patient x-rayed at one of our Minneapolis Hospitals. The x-ray diagnosis was duodenal ulcer. On the advice of his physician, the patient started taking soda. He also followed a Sippy regimen. He was no better, so his physician referred him to an internist. The internist after some study said the patient had coronary disease. The patient then carried soda in one vest pocket and nitroglycerine in the other. The patient was accustomed to dealing with judicial matters and after what he regarded as a satisfactory period of trial without relief from either therapeutic agency, sought more advice. About a year's time was consumed in all this. The patient's physician then suggested a surgical consultation. My first question was: "Has your stomach been pumped?" He said, "No."

He was found to be achlorhydric. An x-ray examination was made of the stomach. It was reported to be negative. The roentgenologist—and a very good one—was informed that the patient had pain and was achlorhydric. A second x-ray examination of the stomach was made. It was negative. The patient was then submitted to gastroscopic examination. The gastroscopist, Dr. R. S. Ylvisaker, described a superficial palm-sized lesion, occupying the upper end of the lesser curvature. With this information at hand, the roentgenologist felt there might be a lesion present. How many times do any of us get a third chance?

At operation, I could feel no lesion. On the basis of Dr. Ylvisaker's report, however, I did a 95 per cent gastric resection. You will note in this slide how closely it conforms to the gastroscopic description. Almost seven years have gone by. The man is well. Now, he carries neither soda nor nitroglycerine. The lesion was a cancer with one lymph node involved. Ascertainment of the presence of achlorhydria brought him to operation.

Let me recite another case history. This concerns the widow of a well known physician in our area. She went to her physician complaining of abdominal pain shortly after the death of her husband. On roentgen study, a gastric ulcer was found. Periodically, over a two-year interval, roentgen and gastroscopic examinations were carried out,—during which time six x-ray studies and four gastroscopic examinations were done. Because abdominal pain persisted, the patient's son-in-law, a surgeon in Minneapolis, asked me to see the patient. The roentgenologist and the gastroscopist both continued to express the opinion that the lesion was benign.

My first question was: "Has your stomach been pumped?" The patient answered: "No." She was found to be achlorhydric to histamine. A very radical total gastrectomy was done and the patient is alive and well now, five years later.

Each year, cases of this type are seen in our Clinic. I would suggest that you inquire whether gastric aspiration is used to the fullest extent in your

area in the detection of gastric cancers. What happens in Minneapolis, I suspect is representative of what obtains in the country as a whole. We cannot neglect a single facet of useful information. Moreover, clinicians, radiologists and gastroscopists need to pool their information freely in their cases.

Walter Palmer and his associates at the University of Chicago write of the management of peptic ulcer with x-ray treatment. The slide shown here is of a patient in whom a large ulcer perforated the stomach and the entire thickness of the abdominal wall, save the skin, following x-ray treatment for an abdominal malignancy. This occurrence following x-ray irradiation of the retroperitoneal lymph nodes for carcinoma of the testes is well known. Yet, the Chicago group of internists would have us believe that they cure peptic ulcer by irradiation of the stomach. In any case, x-ray irradiation as a method of treatment of peptic ulcer has not gained any vogue. There appears to be little if any evidence that the method has real merit. The lady whose slide I have just shown you is the wife of a military medical officer. She has done well following gastric resection.

In a discussion such as this, it is entirely proper, I believe, to point out that duodenal ulcer and idiopathic esophagitis in its many manifestations are in all likelihood direct consequences of acid-peptic action. On the contrary, resistant as gastric mucosa is to injury by acid-peptic juice, one sees gastric erosions not infrequently in stomachs secreting very little acid. Moreover, patients having gastric ulcer, in the main, usually have less free HCl than do patients with duodenal ulcer. And generally speaking, patients with duodenal ulcer have a heavy fundic and corporic gastric mucosa as contrasted with patients having gastric ulcer in whom this area of the gastric mucosa is often thin and less heavily rugated. In other words, whereas the acid-peptic factor does play a role in the genesis of gastric ulcer, it undoubtedly is not the sole factor or as important a factor as acid-peptic juice is in the origins of duodenal ulcer or esophagitis. Does this circumstance have any bearing upon the origins of gastric cancer? Possibly so.

Inasmuch as in another segment of this conference I have discussed at some length the matter of the surgical management of gastric cancer, I shall only emphasize here the great importance of early diagnosis. We need to sharpen our clinical acumen in this area of interest. It could prove a very fertile field of activity for any group who will devote themselves assiduously to improving technics of diagnosis. Obviously, a new idea or two, and a fresh approach might prove very helpful. Apart from this, radical gastrectomy, at the earliest possible moment the diagnosis can be made, is in order. Total gastrectomy is taking precedence in my hands over partial gastrectomy for all gastric cancers, save those which are juxta-pyloric in location. An adequate operation, it is plain, includes wide excision of the lymphatic drainage area, including careful dissection of the portal triad in the hepatic pedicle—an area which has been

neglected by surgeons. Radical surgery in practiced hands is proving its worth in cancer of the stomach. Gastric cancer is curable if diagnosed in time and treated aggressively by radical surgery. A number of well-known surgeons have died of it, including Mikulicz-Radecki.

Dr. Snapper:—Cancer of the cardia.

Dr. Wangensteen:—W. J. Mayo, David Wilkie and Martin Kirschner—all well known for important contributions to the surgery of gastric cancer—all died of gastric cancer. This very circumstance tells much concerning the insidiousness of gastric malignancy.

I would like all of us to leave this conference with the feeling that cancer of the stomach is not a hopeless disease; that the physicians of this great hospital will strive to diagnose gastric cancer early and send their patients for operation, fully convinced that surgery has something important to offer the patient—yes, often it gives him a pleasant extension—and not infrequently a long extension of life. To most of us, that is important.

When as a young house-officer, somewhat more than three decades ago, I did a stint in our Out-Patient Medical Clinic, it was common practice to dismiss a patient with a prescription for a Decoction of Condurango. Long years later, I learned that Professor N. Friedrich of Heidelberg (Berlin. klin. Wchnschr. **11**:1, 1874) reported that he had cured a patient with gastric cancer with this remedy. For almost 50 years, this remedy had a vogue in the management of gastric cancer. There is no doubt that Friedrich mistook a benign gastric ulcer for a cancer. Let us not in 1954, confuse Condurango, under any other name, with Eldorado! (*laughter*)

It may be of some interest to you, inasmuch as we meet here in the Walter Reed General Hospital—one of the great military hospitals of the world, that a Dr. W. S. W. Ruschenberger, then a Medical Director for the United States Navy, was sent to Ecuador by the United States Government somewhat more than 70 years ago to investigate the alleged cures of cancer by the administration of Condurango. Ruschenberger published a Report on his observations which was published by the United States Printing Office in 1873, entitled: A Report on the Origin and Therapeutic Properties of Cundurango. Ruschenberger concluded his report by saying there was much testimony but no evidence that Cundurango (Condurango) had any curative influence in cancer.

Since some of my preceptors, in the Medical Out-Patient Clinic of the University Hospitals, somewhat more than 30 years ago, abandoned patients with gastric cancer to the meager promise of Condurango, much has occurred in the surgical field to give more than a glimmer of hope to many patients with gastric cancer. Even though that accomplishment is not one of which

anyone can be proud, let no one belittle it. Our friends have a just claim upon our faith in them. Let us hope that our patients have faith in us and in our current practices. A grain of faith the size of a mustard seed can still be very useful to its possessor. Internists who doubt the curability of cancer need to become better acquainted with their surgical colleagues and their work.

Dr. Pruitt:—Thank you, Dr. Wangensteen. It was very worthwhile.

There is one last question which has to do with pathogenesis and treatment of macrocytic anemias in postgastrectomy. I could not get anyone on the panel to answer that, and I will make a quick attempt at it.

As you know, the pathogenesis is unknown, except possibly it might be from gastritis or loss of blood, and they do respond very well to time.

I want to thank the members of the panel for their excellent, earnest and sincere presentations, and also Dr. Snapper for his contribution.

THE SURGICAL ASPECTS OF PORTAL DECOMPRESSION*

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Portal hypertension continues to be a problem to both the surgeon and the internist. The most common cause of portal hypertension is obstruction of the portal bed, which may be intrahepatic or extrahepatic. Such obstruction results in an attempt by nature to shunt blood from the portal venous system into the systemic venous system. In doing so, many patients with portal hypertension develop esophageal varices. These varices tend to rupture with a resulting massive hematemesis which is frequently fatal. Death may result from the exsanguinating hemorrhage and complicating shock or from liver failure precipitated by the hemorrhage.

Tocantins[1] has stated that there are other factors involved in hemorrhage from esophageal varices and classified these factors according to the following:

1. *Vascular defects:*—The involved veins are stretched, undermined, and ruptured.

2. *Extravascular defects:*—The mucosa overlying the veins is thinned, eroded and contributes to rupture of the veins.

3. *Intravascular defects:*—The thrombopenia and hypoprothrombinemia hinder prompt and effective plugging of the vascular defect.

Primarily surgical decompression serves to correct the first of these factors, vascular defects. In those patients in whom hypersplenism exists, surgical therapy may also alleviate the third factor, intravascular defects, by either decreasing the splenic congestion or by excision of the spleen.

Many operations have been devised to aid the patient with portal hypertension. These may be classified as: (1) operations devised to obliterate or remove the varices, as the esophagogastric resection, or suture of the esophageal varices; (2) operations designed to decrease portal blood flow, as the simple splenectomy, or splenic and hepatic artery ligation; and, (3) operations intended to increase the flow of blood from the portal venous system into the systemic venous system. Numerous operations have been utilized to achieve this result. The simplest is

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the omentopexy. Grafts of various kinds have been used to connect the portal and caval systems. Anastomosis between the superior mesenteric vein and the vena cava, and between the splenic vein and the vena cava have been accomplished. More commonly used are the end-to-side and side-to-side portacaval shunts and the end-to-side splenorenal shunt.

In recent years, the direct portacaval and splenorenal shunt operations have become accepted procedures in the treatment of portal hypertension. The utilization of the end-to-side portacaval and splenorenal shunts in the treatment of this condition will be discussed in this paper. This discussion is based on our experience with 52 such operations, but any statistical data will be based on the first 30 patients[2] whose follow-up studies have been completed.

The shunt operation is a variation of nature's own attempt at portal decompression. Natural anastomoses exist between the portal and caval systems. In attempting to compensate for the increased pressure in the portal system, many collaterals existing between the portal and caval systems are enlarged and new shunts are apparently formed. Sometimes these are larger than the surgical shunt but do not effectively relieve the increased portal pressure[3]. Many collaterals manifest themselves as esophageal varices. In some instances, natural shunts about the liver cause a cavernomatous transformation of the hepatoduodenal ligament, virtually converting it into a hemangioma. Hemorrhoids are common in such cases, as are spider hemangiomata of the skin and enlargement of the superficial veins of the abdomen.

Encouraging results have been reported from use of the shunt operations in dealing with bleeding esophageal varices. While many shunt operations have been devised to alleviate portal hypertension, only the portacaval and splenorenal operations have withstood extensive clinical application. These procedures at best are not entirely satisfactory. As most authors have stressed, the shunt operation does not affect the primary pathology but only attacks one facet of it by providing mechanical relief of portal hypertension.

Twenty-eight or 93.4 per cent of our first 30 patients had portal hypertension due to an intrahepatic block. Only 2 or 6.6 per cent had an extrahepatic block. No patient was rejected for shunt operation because of severe liver dysfunction. Early in the series, surgery was reserved for only those patients who had had esophageal hemorrhage. The results in this group were so satisfactory that the indications for operation were extended to encompass those patients with portal hypertension and extensive esophageal varices who had not bled. Only 6 per cent of the 30 patients had a shunt performed as a prophylactic measure.

Preoperatively, esophagoscopy was carried out routinely. The size and extent of esophageal varices were determined and manometric pressure readings were taken in the esophageal varices without complications[4]. Liver profile studies were

performed, percutaneous liver biopsies were taken, and rectum-to-lung ether circulation times were measured in all patients preoperatively.

Technic

The direct portacaval shunt operation is the procedure of choice, since a larger anastomosis can be obtained between the two systems by this method than by a splenorenal shunt. In order to determine the basic nature of the disease involved and the type of shunt which will be most functionally adequate, portal venography via percutaneous splenic puncture is accomplished on the operating table prior to positioning the patient for surgery. This study is accomplished by the injection of 25 to 30 c.c. of 70 per cent diodrast into the splenic pulp, using an 18 gauge spinal needle inserted through the ninth intercostal space in the posterior axillary line. We have found this procedure extremely valuable in avoiding unnecessary exploratory operations.

Once it is determined that the extrahepatic portal system is patent, we proceed with the direct portacaval shunt operation. A thoracoabdominal incision is made which extends from the right posterior axillary line along the course of the eighth rib, toward the umbilicus. The eighth rib is resected subperiosteally and the abdominal muscles transected. The diaphragm has been opened both radially and circumferentially but while the latter is more time-consuming, it appears to minimize diaphragmatic paralysis following surgery.

On exploration, a number of problems may be encountered. It is not unusual to find that nature has already performed an omentopexy. Similarly, the colon and other viscera are often adherent to the liver. When these adhesions are dissected free, they are found to contain many collaterals of varying sizes which may cause excessive bleeding because of the increased portal pressure. The caudate lobe of the liver frequently shows extensive regeneration and lobulation which may compromise the operative field. Not uncommonly, masses of varices are found in or near the hepatoduodenal ligament. These sometimes make impossible the accomplishment of a portacaval anastomosis. In such cases, the portacaval approach may have to be abandoned and a splenorenal shunt attempted.

In the operable cases, the portal vein is palpated for size and to confirm the patency demonstrated by the splenogram. The vein is then dissected from the hepatoduodenal ligament from its bifurcation at the hilum of the liver to behind the duodenum or until ample length is insured for anastomosis to the vena cava without tension. The coronary vein is identified, ligated, and divided when possible. The anterior surface of the inferior vena cava is then isolated in the area where the anastomosis is to be performed.

Manometric pressure readings in millimeters of saline are taken in both the portal vein and the vena cava. The portal vein is doubly ligated at its bifurca-

tion, and an angled Potts coarctation or ductus clamp is applied to the portal vein, which is then transected. If there is any evidence of tension at the site of anastomosis, further dissection is carried out.

A large curved Potts bulldog clamp is placed in its long axis on the anterior surface of the vena cava. An elliptical segment the approximate size of the portal vein diameter is excised from the isolated segment of the vena cava. An end-to-side anastomosis is then performed, using a continuous over-and-over suture of 00000 braided arterial silk.

Following removal of the clamps there is only minimal, if any, bleeding, at the suture line. This has never been a problem. Portal and caval manometric readings are repeated and the wound is closed. It has been observed that if the portal pressure is measured immediately on release of the clamps, it is much higher than if measured 20 minutes later. Apparently time must be allowed for the pressure in the temporarily blocked portal system to reach an equilibrium.

The operation for splenorenal shunt differs slightly. The ninth rib instead of the eighth is resected subperiosteally. The spleen is removed and an end-to-side anastomosis between the splenic vein and the left renal vein is performed. The same vascular clamps are employed. We have found the splenorenal shunt more difficult technically to perform, more time-consuming, and far less satisfactory than the portacaval shunt. The average operative time for all cases is approximately 3 hours. The splenic and renal vessels are small and do not allow a shunt of adequate size to be made. By virtue of the location of these vessels, there is more tendency toward twisting, kinking, and tension on the anastomotic site with changes in body position, and, therefore, an increased tendency toward thrombosis.

Postoperative Results

Postoperatively, these patients receive a continuous intravenous drip of aureomycin, 1/2 gm. in 1,000 c.c. of 5 or 10 per cent glucose and water every 12 hours, for a period of 2 to 3 days. After the nasogastric tube is removed, aureomycin is given by mouth for a total of 5 to 7 days. Some patients with severe liver dysfunction are prone to develop postoperative hepatic failure. Aureomycin has been found useful in preventing or helping to combat such failure. Theoretically, bacteria and bacterial toxins normally picked up by the portal system from the intestine and filtered out in the liver are now shunted directly into the systemic venous system. The use of aureomycin may inhibit these bacteria.

Manometric pressure readings taken in the portal vein prior to shunting have been found to compare very favorably with pressures taken preoperatively in the esophageal varices by esophagoscopy. These pressures have ranged from 300 to 550 mm. of saline pressure. Following shunting procedures, the portal pressure dropped over 200 mm. of saline in most of the patients.

Observing a variation of portal pressure drops for shunts of equal size, we began recording preshunt vena cava pressures. These were found to range up to 220 mm. of saline. Following shunting procedures, the portal pressure equalized with the vena caval pressure and obviously could not be dropped below the initial vena caval pressure.

Postoperative studies of the esophageal varices by esophagoscopy have shown disappearance of a number of the varices and decrease in size and pressure of others. When pressure readings were obtainable in the remaining varices, they were comparable to the pressure in the portal vein following the shunting procedure. While there appears to be a correlation between the portal vein and esophageal varix pressures, there does not appear to be a correlation between size of the varices and tendency toward hemorrhage[5]. In this series, only 2 patients have had postoperative hemorrhage, both minor, but both having demonstrable esophageal varices.

Postoperative liver function studies have shown temporarily increased dysfunction. This appears to be related in part to the anesthesia and operative trauma. These alterations persist for 7 to 10 days. Late follow-up studies have shown neither a harmful effect nor a significant improvement in liver function as a result of complete diversion of the portal blood stream.

Although we have not rejected a patient for a shunt operation because of severe liver dysfunction, there have been only 2 deaths from liver failure as a result of surgery in this group of 30. We believe that maximum preoperative preparation, minimal anesthesia and operative trauma, minimal blood loss, and the use of aureomycin postoperatively is responsible for keeping the mortality rate to a minimum and for the gratifying results thus far obtained.

Summary

1. An evaluation of the portacaval and splenorenal shunting operations as methods of portal decompression is presented.

2. Statistics are based on follow-up studies of the first 30 of 52 patients with shunt operations.

3. Technics of portal venography and portacaval and splenorenal anastomoses are presented.

4. Preoperative and postoperative manometric pressures taken in the portal vein and vena cava have been found to correlate with results obtained.

5. No patient was denied surgery on the basis of poor liver function studies.

6. Postoperative alterations in hepatic function were found to last only seven to ten days.

7. Two patients died of liver failure as a result of surgery.

8. Two patients have bled from esophageal varices postoperatively.

9. The direct end-to-side portacaval shunt is considered to be the operation of choice for portal decompression.

REFERENCES

1. Tocantins, L.: Hemorrhagic tendency in congestive splenomegaly (Banti's Syndrome), it's mechanism and management, J. A. M. A. **136**:616-622 (Feb. 28), 1948.
2. Jahnke, E. J., Jr., Palmer, E. D., Sborov, V. M., Hughes, C. W., and Seeley, S. F.: An evaluation of the shunt operation for portal decompression, Surg., Gynec., & Obst. **97**:471-482 (Oct.), 1953.
3. Ripstein, C. B.: Experiences in the treatment of portal hypertension, Surgery **34**:570-579 (Sept.), 1953.
4. Palmer, E. D.: Determination of venous pressure within esophageal varices, J. A. M. A., **147**:570-571 (Oct. 6), 1951.
5. Palmer, E. D.: Problems associated with the natural history of esophageal varices, Med. Ann. District of Columbia **23**:303-307 (June), 1954.

THE MEDICAL ASPECTS OF PORTAL DECOMPRESSION IN CIRRHOSIS*

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Introduction

During the past 15 years, a great deal of effort has been devoted to improvement of the therapy of cirrhosis of the liver. With the wide spread application of diet therapy more and more patients with this disease are surviving episodes of jaundice and ascites. The use of antibiotics has diminished the hazards of intercurrent infection. In spite of the increased availability and more liberal use of blood transfusions, however, patients with cirrhosis continue frequently to succumb from bleeding from esophageal varices. The development of portal hypertension and collateral venous pathways are frequently a late complication of cirrhosis, brought about by constriction of the intrahepatic portal bed by fibrosis and nodular regeneration of the damaged liver. Such patients may appear to have recovered completely from hepatic decompensation, only to bleed suddenly from varices. In recent years endoscopic examination of the esophagus has demonstrated that varices are present in a very large proportion of unselected cases of cirrhosis—65 per cent in one series[1].

Statistics on the survival of patients with cirrhosis after hemorrhage from esophageal varices indicate the urgency of the problem. Ratnoff and Patek[2] found that 40 per cent of such patients were dead of hemorrhage within a month. In most of these patients the bleeding represented the terminal episode of a progressive down-hill course in severe liver failure. Another 30 per cent died within a year of their first hemorrhage, frequently of repeated bleeding. In many of these latter patients liver function was good before the episode. If, however, a patient survives for a year, he has a good chance of living for another one, two, three or more years.

A great many surgical procedures have been devised to reduce portal hypertension. The only effective operations appear to be those in which a direct shunt is constructed from the portal venous system to the inferior vena cava or its branches. Although such operations can apparently prevent recurrence of hemorrhage from varices, until recently they have carried a high mortality rate. In addition there has been considerable disagreement as to the specific indications for operation.

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Case Selection

The main indication for the performance of a shunt operation is, of course, hemorrhage from esophageal varices. It is necessary to find proof that gastrointestinal hemorrhage in a patient with cirrhosis is indeed produced by esophageal varices. It is well known that patients with cirrhosis have a higher incidence of peptic ulcer than the general population. Another frequently overlooked cause of hemorrhage in cases of cirrhosis is severe acute erosive gastritis. This condition, rather than varices, is frequently the cause of bleeding in a patient with the stigmata of severe liver decompensation, jaundice and ascites. Therefore, a patient with cirrhosis who is bleeding requires careful endoscopic and roentgenologic examination to determine the source of bleeding, before consideration is given to the performance of a shunt operation.

Since the first gastrointestinal hemorrhage in a patient with cirrhosis is so often fatal, we have performed a number of shunt operations in patients with varices which have never bled[3]. In such of these patients who were properly followed, there have been no episodes of bleeding since operation. The number of such patients is so small, and the length of follow-up so short, that it cannot be surely stated that we have prevented any hemorrhages. It should be pointed out in this regard that not enough is yet known of the natural history of varices to say with certainty that all varices are dangerous. Varices are assuredly not the static entity they were once considered to be. A number of patients have been reported in whom varices, seen via the esophagoscope, have later disappeared spontaneously[4]. In some of these cases the subsidence of the varices accompanied improvement in liver function. This observation has been confirmed on a few patients at Walter Reed Army Hospital.

In the past, shunt operations have been performed with the hope of relieving intractable ascites. This has been based on the belief that portal hypertension is a major factor in the production of ascites. Recent studies indicate that the site of ascites formation is the liver proper rather than the radicles of the portal vein[5]. It appears that liver damage and scarring increase the flow of liver lymph to such an extent that it accumulates in the abdominal cavity. This process has been shown experimentally not to depend upon elevation of the portal pressure. Accordingly we have not considered intractable ascites an indication for shunt operation. Indeed we have seen cases in which a shunt operation had no discernible effect on the rate of accumulation of ascites.

The main contraindication to operation for the relief of portal hypertension is severe impairment of liver function. It is notorious that patients with cirrhosis withstand anesthesia and operation poorly. This has been borne out in our series in which almost all the postoperative deaths have occurred in patients with very severe liver function abnormalities. Certainly impending coma is an absolute contraindication to surgery, and probably the combination of marked jaundice and ascites is also. Mild jaundice, however, should not delay operation, nor should

even marked changes in the flocculation and turbidity tests. We feel that the liver function tests should be stable. Among the liver function tests, the serum albumin is the best single guide to suitability for operation. In our series those patients with a serum albumin of less than 2 gm. per cent had an operative mortality rate between 25 and 50 per cent.

Almost every patient responds to operation with a period of worsening of the liver compensation, the degree of which seems to be proportional to the length of anesthesia and severity of surgical trauma. Therefore, any factor which will tend to prolong surgery is a relative contraindication to operation. For example, if there is uncertainty as to the location of the block in the portal vein so that prolonged exploration may be necessary, or if there has been previous surgery in the area so that adhesions present a technical surgical problem, consideration should be given to postponement of operation if it is feasible to do so.

Management During and After Operation

Patients selected for shunt operations demand very careful attention from the internist before, during and after operation. Preoperative treatment consists of the usual measures against cirrhosis, namely rest, good diet, and withdrawal of alcohol. There is no need for vitamins if the patient can be persuaded to eat satisfactorily. Restriction of salt intake may be necessary if ascites is present. There is no need for blood transfusions except after hemorrhage. Mild degrees of anemia are well tolerated, whereas blood transfusion always carries with it the hazard of homologous serum hepatitis which may prove fatal in a patient who already has severe liver damage. The use of salt poor human serum albumin has given only equivocal benefit; its use may even predispose to hemorrhage because of blood volume expansion.

At the time of operation it must be remembered that patients with severe liver damage are extremely susceptible to sedatives and narcotics, particularly morphine. These medications should be used in reduced dosage or not at all. Anesthesia and surgery require the highest degree of professional skill. The duration of operation and anesthesia must be kept as short as possible. Hypotension must not be permitted to occur. Careful blood and fluid replacement is necessary. Although the overall operative mortality in our series is less than 10 per cent[3], this figure is low because of the inclusion of a large number of patients in excellent physical condition, particularly those who have never bled.

Postoperatively one usually sees a rise in the serum bilirubin, frequently with clinical jaundice. The height and duration of this rise appears to be related to the severity of the liver damage, the length of operation, and the severity of operative trauma. There has usually been a fall in the flocculation and turbidity tests after surgery lasting from two to three weeks[6]. The cause and significance of this fall are unknown. Aureomycin has been given routinely to patients undergoing shunt operation for the first week after operation. It has been given orally when the

patient can tolerate it, otherwise intravenously. If a patient develops more than mild evidence of hepatic decompensation postoperatively, the aureomycin has been continued for much longer periods. The rationale for the use of this antibiotic is its reported good effect in hepatic coma[7]. In theory, aureomycin by reducing bacterial growth in the bowel, decreases the formation of various toxic substances, particularly ammonia[8], which are ordinarily screened from the systemic circulation by the liver. After a shunt operation these toxins are delivered directly into the systemic blood stream and may be responsible for some of the manifestations of hepatic decompensation seen after surgery. Conservatism is urged in ambulation of patients convalescent from operation. Sedatives and analgesics must be used sparingly. Because of recent evidence that high protein feeding is occasionally toxic after shunt operation[9, 10] it is recommended that there be no forcing of the patient's protein intake.

Results of Operation

In the series of patients at this institution in whom portacaval shunt operations have been performed there have been no bad effects which could be referred to the presence of the shunt itself. Many years ago a syndrome of "meat intoxication" was noted in normal dogs in whom Eck fistulae had been produced. This consisted of the appearance of coma and other central nervous system signs after the ingestion of meat. This is now thought to be caused by liberation into the systemic circulation of ammonia from nitrogenous compounds in the bowel[8]. Although a rather similar picture has occasionally been seen in humans[9, 10] it did not appear in this series. It seems likely that in patients who have esophageal varices a functional portalsystemic shunt is already present although inefficient; such patients have already become accustomed to the absorption of the hypothetical toxic compound.

In all of our patients examined esophagoscopically after operation there was definite improvement in the esophageal varices. In a recent compilation[3] the varices had disappeared in 57 per cent; collapsed veins could still be seen in another 17 per cent; and in 13 per cent varices were still present but improved, and in the remaining 13 per cent adequate examination was not possible. Thus, of those patients satisfactorily examined, 80 per cent showed disappearance of varices. The patient follow-up has not gone far enough in our series to determine with statistical reliability whether or not there has been significant decrease following shunt in the number of episodes of hemorrhage. Although very few episodes of bleeding have been observed, it is difficult to separate the effects of good general medical care from those of the operation itself. In 30 cases adequately followed after operation bleeding has occurred in only two. In these two cases the varices had improved, but not disappeared, after shunt. As yet there has been no episode of bleeding in patients in whom a shunt was done without a history of bleeding.

The splenorenal shunt has been inferior to the portacaval in its effect upon varices. It was the impression of the surgeon that it was difficult to obtain satisfactory blood flow through the small shunt. Endoscopic examination has tended to confirm this: varices are less likely to disappear completely after this type of operation.

Great reliance must be placed upon esophagoscopic examination not only in diagnosis of the presence of esophageal varices, but also in observation of the effects of operation. In fact, there is no other satisfactory way of following changes in varices. A technic which has been of value is the determination of the venous pressure within varices at the time of esophagoscopy[11]. This has compared very well with direct measurements of portal vein blood pressure at operation. It is believed that pressure readings obtained in varices persistent after operation are also good reflections of the existing portal bed pressure.

Another technic that is of value in following patients after shunt operation is the "portal circulation time"[12]. This consists of the measurement of the time interval for the passage to the patient's breath of ether vapor instilled in the rectum. Although this time varies widely before operation and appears to be of little diagnostic value, the time is markedly and uniformly shortened after operation in patients in whom a large satisfactory shunt was obtained. There has been a rough parallel between the length of this time and the degree of elevation of venous pressure in varices. In one patient in whom there was other evidence of the closure of the shunt, the portal circulation time rose to the preoperative value.

Conclusions

1. Portacaval shunt operations have a real place in the treatment of severe chronic liver disease. There appear to be no bad effects of the shunt itself.

2. The prime indication for a shunt operation is hemorrhage from esophageal varices. The source of bleeding should be accurately determined by careful x-ray and endoscopic examination. The nature of the liver disease and the specific location of the block in the portal system must be decided by careful, complete medical evaluation before operation. Intractable ascites is not an indication for operation.

3. Shunt operations may be done in patients with varices who have not bled, but the value of operation is not yet settled because so little is known of the natural history of esophageal varices.

4. Severe impairment of liver function is a relative contraindication to operation. More than a slight degree of jaundice, and depression of the serum albumin below 2 gm. per cent make the operation very hazardous. In such patients the chances of recurrent hemorrhage must be balanced against the markedly increased operative mortality in coming to a decision.

5. Highly skilled anesthesia, surgery, and medical management are required during and after operation. The routine use of aureomycin is recommended.

6. The performance of a portal-systemic shunt operation will cause varices to disappear in as high as 80 per cent of patients. The operation definitely reduces the risk of hemorrhage in patients with varices.

1. Brick, I. B. and Palmer, E. D.: Esophageal Varices and Vascular Spiders in Cirrhosis of the Liver. J. A. M. A., **155**:8, 1954.
2. Ratnoff, O. D. and Patek, A. J., Jr.: The Natural History of Laennec's Cirrhosis of the Liver. Medicine, **21**:207, 1942.
3. Jahnke, E. J., Jr., Palmer, E. D., Sborov, V. M., Hughes, C. W. and Seeley, S. F.: An Evaluation of the Shunt Operation for Portal Decompression. Surg. Gynec., & Obst., **97**:471, 1953.
4. Bennett, H. D., Lorentzen, C. and Baker, L. A.: Transient Esophageal Varices in Hepatic Cirrhosis. Arch. Int. Med., **92**:507, 1953.
5. Hyatt, R. E. and Smith, J. R.: The Mechanism of Ascites. Am. J. Med., **16**:434, 1954.
6. Palmer, E. D., Sborov, V. M. and Jahnke, E. J., Jr.: Effects of Surgical Treatment of Esophageal Varices on Portal Venous Pressure and Hepatic Function. Gastroenterology, **24**:10, 1953.
7. Farquhar, J. D., Stokes, J., Whitlock, C. M., Jr., Bluemle, L. W., Jr. and Gambescia, J. M.: Studies on the Use of Aureomycin in Hepatic Disease. III. A Note on Aureomycin Therapy in Hepatic Coma. Am. J. M. Sc., **220**:166, 1950.
8. Traeger, H. S., Gabuzda, G. J., Jr., Ballou, A. N. and Davidson, C. S.: Blood "Ammonia" Concentration in Liver Disease and Liver Coma. Metabolism, **3**:99, 1954.
9. Phillips, G. B., Schwartz, R., Gabuzda, G. J., Jr. and Davidson, C. S.: The Syndrome of Impending Hepatic Coma in Patients with Cirrhosis of the Liver given Ntirogenous Substances. New England J. Med., **247**:239, 1952.
10. McDermott, W. V., Jr. and Adams, R. D.: Episodic Stupor Associated with an Eck Fistula in the Human, with Particular Reference to the Metabolism of Ammonia. J. Clin. Invest., **33**:1, 1954.
11. Palmer, E. D.: Determination of Venous Pressure within Esophageal Varices. J. A. M. A., **147**:570, 1951.
12. Waldstein, S. S., Forsyth, B. T. and Jahnke, E. J., Jr.: An Evaluation of the Rectum-to-Lung Ether Time Test in Shunt Operations for Portal Hypertension and in Liver Disease. Gastroenterology, **26**:781, 1954.

SOME ORAL LESIONS OF GASTROENTEROLOGIC INTEREST*

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All too often examination of the oral cavity is hasty or even neglected in the examination of a patient who presents symptoms of gastrointestinal disease[1]. To one who has not placed emphasis upon this examination, many of the mouth lesions look alike and are difficult to diagnose. The recognition of mouth lesions is not, however, as hopeless as has often been expressed, particularly by one of my colleagues who has said, "There is no use to look in the mouth; in the first place you can't see anything, and in the second place, even if you do, you don't know what you are looking at."

Some of the more common mouth lesions are rather distinctive in appearance and when considered with other findings, may be helpful in differential diagnosis of systemic disease. It is our purpose to discuss some of the more important mouth lesions that may occur with diseases having symptoms referable to the alimentary tract. An outline of these conditions follows:

I. Pigmentations

1. Adrenocortical insufficiency
2. Intestinal polyposis with oral melanosis (Jeghers)

II. Inflammations and Infections

1. Herpes simplex and aphthous stomatitis
2. Erythema multiforme
3. Pemphigus
4. Lichen planus
5. Lupus erythematosus
6. Moniliasis
7. Hairy tongue
8. Geographic tongue
9. Ulceromembranous stomatitis (Vincent's)
10. Nonspecific stomatitis and glossitis

III. Drug and Chemical Eruptions

1. Lead line
2. Bismuth line
3. Mercury

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4. Other metals
5. Drugs prone to cause oral lesions
6. Dilantin
7. Phenolphthalein

IV. Metabolic disorders

1. Xanthomas
2. Amyloidosis
3. Diabetes

V. Avitaminoses

1. Sjogren's Syndrome
2. Ariboflavinosis
3. Pellagra
4. Sprue
5. Scurvy

VI. Blood Dyscrasias

1. Hemophilia and purpura
2. Hypochromic anemia
3. Agranulocytosis
4. Leukemia

VII. Leukoplakia

VIII. Factitial Lesions

I. Pigmentations

In adrenocortical insufficiency, discrete pigmented spots or streaks are found on the inner surfaces of lips, cheek and tongue. The color of these varies from bluish gray or slate to brown or brownish black. These are deposits of melanin and in tissue section the pigment forms caps over the nuclei of the basal layer of the epithelium. Since this disease is often vague or deceptive in its onset, the finding of pigmented spots in the mouth in association with gastrointestinal symptoms should suggest Addison's disease be considered in the differential diagnosis of such a patient.

Somewhat similar spots on the lips, gums, inner cheeks and hard palate have been reported by Jeghers et al[2] in association with generalized intestinal polyposis. These pigmented spots are smaller and more numerous, being especially prominent on the lips. While these spots are due to melanin, histologically the pigmentation is distributed in vertical bands throughout the epidermis, and thus presents quite a contrast to the histologic pattern of Addison's disease. In Jeghers syndrome there are dark brownish discrete spots on the face, fingers and toes, in addition to the mucous membrane lesions.

II. Inflammations and Infections

Aphthous stomatitis is a term applied to nonspecific ulcerations in the mouth, appearing as discrete shallow greyish erosions with hyperemic borders and often covered by a yellowish white slough. The lesions often are recurrent and have been associated with or attributed to fever, upper respiratory infections, menstruation, gastrointestinal upset, food idiosyncracies, prolonged use of mouth washes, antibiotic lozenges and even emotional upsets. In some series of cases, herpes simplex virus has been isolated while in others it has not[3,4]. It is quite possible, however, that the herpes virus is latent and the etiologic factors listed above serve as exciting causes to precipitate the attacks. We felt some of our patients with recurring aphthous stomatitis were benefited by repeated smallpox vaccinations at weekly intervals for six weeks.

In a review of skin lesions associated with ulcerative colitis, Samitz and Greenberg[5] reported aphthous stomatitis accompanying the colitis. In one group of cases they observed that the aphthous lesions and erythema nodosum preceded by 24 hours the attack of colitis.

Erythema multiforme is a term applied to a group of diseases, of unknown cause, in which the skin lesions are polymorphous, being macular, papular, vesicular or bullous. Commonly, the mucous membrances are affected, particularly those of the mouth, where the disease often begins. The mouth lesions are usually vesicles, flaccid bullae, or shallow ulcerations covered by a greyish membrane and showing an erythematous border. These may be seen anywhere in the mouth and often they extend to involve the nasal and pharyngeal mucosa. Lesions on the vermillion border of the lip are crushed, purulent and in severe cases, hemorrhagic.

We agree with Robinson[6] who feels erythema multiforme should include Stevens-Johnson syndrome, Behcet's syndrome and ectodermosis erosiva pluriorificialis. These syndromes have many clinical and pathologic features in common, and in all cases the etiology is unknown. In some cases of erythema multiforme, however, causes have been found and these have included drugs, serum injections, foci of infection and wasting diseases. We recall one case in which bullous erythema was the presenting lesion in a patient found to have carcinoma of the stomach with metastasis. In consequence then, patients who show multiforme erosive lesions of the mouth without any obvious cause should be carefully examined for evidence of gastrointestinal disease.

Pemphigus is a rare disease of the skin characterized by successive crops of bullae which develop on an uninflamed skin. It is accompanied by severe constitutional symptoms and its outcome is fatal. It is not unusual for the disease to begin in the mouth. The primary lesion in this situation is usually seen on the gums as a flaccid bulla which is easily ruptured and then becomes covered by a yellowish pellicle. The lesions tend to become more numerous with extensive denudation of the oral mucosa and with involvement of the pharynx and

esophagus. Pain ensues and this may be so severe as to interfere with ingestion of adequate solid or liquid nourishment.

When the bullae are present on the skin, the diagnosis is facilitated particularly by biopsy or examination of the stained bulla fluid or stained scrapings from the floor of the lesion. When only mouth lesions are present, the same procedures are used, but biopsy is a bit more difficult and one may wish to depend upon the latter technics. Civatte and others[7,8] have reported that in true pemphigus, many of the epidermal cells degenerate, appear swollen, round or ovoid and devoid of prickles. This change is called acantholysis and is considered by many to be almost pathognomonic of pemphigus. Because of the grave prognosis of this disease, it is important that its diagnosis be made early and accurately.

Lichen planus, while primarily a skin disease characterized by purplish pruritic papules on the flexors surfaces of the extremities, is not infrequently found in or limited to the mouth. In the series of mouth lesions reported by McCarthy and McCarthy[9] it was the most frequent inflammatory lesion found. The lesions are greyish or bluish white, 1 mm. or less sized papules which form linear streaks or varied shaped patches, most commonly found on inner surface of cheeks and occasionally on the dorsum of the tongue.

The clinical diagnosis is difficult if the patient does not develop any skin lesions. Biopsy of the mouth lesion should be done but the histologic appearance of the lesion is not always diagnostic, for it may be difficult to tell from early leukoplakia. Prolonged observation and response to therapy may be required for an accurate diagnosis.

Lupus erythematosus may involve the mouth. McCarthy and McCarthy[9] state, "Silent lesions of lupus erythematosus in the oral cavity are relatively numerous and the incidence is definitely higher than is usually assumed, since the mouth is not examined in all cases." The lesions may appear on the lips, buccal mucosa, dorsum of tongue and hard palate. They appear as greyish white erosive areas that are slightly depressed and are surrounded by a distinct red halo. While the disease may begin in the mouth, it is usually not long until the skin lesions develop. The appearance of the mouth lesion may suggest lupus erythematosus, but a definitive diagnosis would depend upon the appearance of the skin lesions, biopsy of same and in severe cases the demonstration of the lupus erythematosus cell.

Moniliasis of the mouth (thrush) occurs as milky white, small, flake-like lesions or large plaques. They tend to adhere to the underlying mucosa and upon forcible removal show a raw red surface with bleeding points. The most common site is on the inner surface of the cheeks but involvement may be extensive with tongue, gums and palate involved. Diagnosis is made by examination of the plaques and by culture. One of the plaques should be spread out in a thin film and stained. The fungus *Candida albicans* appears as small budding cells and

hyphal fragments. Cultures are made on Sabouraud's media and corn meal agar. On this latter characteristic chlamydospores develop. *Candida albicans* also has been found in cases of perleche, but is probably a secondary invader in that situation.

Moniliasis of the mouth used to be a disease of infants, however, recently it has been reported in adults who have had antibiotics[10], particularly the broad spectrum ones, given over a long period of time. Consequently, one should remember this complication of antibiotic therapy and should learn to recognize early oral moniliasis, for this may presage a generalized cutaneous moniliasis. This generalized form has been unresponsive to therapy and is such a horrible condition that its prevention is of paramount importance. Recently a new antibiotic substance, mycostatin[11], has been reported to be effective against gastrointestinal moniliasis, and this may be effective against the generalized form.

Hairy tongue results from hypertrophy of the filiform papillae, with pigment deposition. Formerly this was quite rare. It occurred as a congenital anomaly or from local irritation; e.g. sodium perborate mouth wash, and tinctures containing vegetable coloring matter. Recently, the disorder has been reported following the use of troches containing penicillin[12] or aureomycin[13].

Geographic tongue, also called transitory benign plaques of the tongue is characterized by gyrate depressed red smooth areas, with sharply demarcated yellowish white borders. The condition should be easily recognized from the clinical appearance, the history of exacerbation and remissions, the changing pattern, and the fact that it is asymptomatic. Local use of penicillin[14] causes clearing of the condition but recurrence is not uncommon.

Ulceromembranous stomatitis (Vincent's angina) is an infectious contagious inflammation of the gums, buccal mucosa and tonsils. The diagnostic features are intensely red swollen mucosa, covered by greyish pseudomembrane, the foul odor, the constitutional symptoms, and regional adenopathy. While Vincent's organisms (Treponema Vincenti and Bacillus Fusiformis) are probably not solely causative and may be only secondary, their demonstration by smear and culture aids in diagnosis. Poor oral hygiene, infection by herpes simplex virus, carious teeth, malnutrition and avitaminosis contribute to the causation of this disease.

A nonspecific stomatitis, characterized by redness, swelling and some flaking of the mucosa has been reported in a variety of diseases of the alimentary tract. A nonspecific glossitis may occur as part of the stomatitis or may exist independently. Such conditions include peptic ulcer, gastric cancer, and biliary cirrhosis. The glossitis of biliary cirrhosis is associated with bleeding gums and jaundice[15]. A smooth tongue, often with dry mouth and dysphagia has been observed with achlorhydria, and a rough coated tongue has been observed with hyperchlorhydria[16]. The smooth red tongue of pernicious anemia is so well known that it demands only passing attention here.

III. Drug and Chemical Eruptions

Lead absorption is an occupational hazard in many industries, such as manufacture of storage batteries, explosives, type metal bronzes, anti-knock gasoline and paints. Painters used to be rather commonly affected but the use of zinc and titanium paints has decreased the incidence of lead toxicity for them. The well-known lead line is a greyish black band in the gums along the gingival margin. It is due to deposit of lead sulfide in the gum tissue. The gums are usually edematous and bleed easily. The lead line, however, is only found in small percentage of cases of lead poisoning. Since such poisoning may be present with severe gastrointestinal symptoms, the line should be looked for, when the cause of such illness is not apparent.

The bismuth line is more discrete than the lead line; it appears along the gingival margin and is bluish or black in color. In addition there may be scattered pigmented spots on the lip, inner cheeks, tongue and palate. This condition was not too rare when bismuth was used in the treatment of syphilis but it usually occurred in a mouth showing evidence of poor hygiene.

Mercurial stomatitis rarely occurs nowadays from the therapeutic use of mercury but is seen because of occupational contact in such industries as manufacture of explosives, felt hats, furs, thermometers, scientific and electric measuring instruments, mirrors, insecticides and photoengraving. The stomatitis begins with excessive salivation, burning metallic taste and swollen interdental gum papillae. Mercury sulfide is deposited in these papillae and it is extremely irritative. The gums separate from the teeth, pus pockets form, the teeth loosen and if the condition is not checked, they may fall out. Gastrointestinal and genitourinary symptoms usually occur with mercurial stomatitis. The diagnosis should be suggested by any severe stomatitis.

Other metals which have caused a nonspecific stomatitis, occasionally with ulceration, include arsenic, gold, chromium, thallium and antimony.

Drug intolerance may be manifested in the mouth independently of, or prior to the onset of cutaneous lesions. Almost any drug is capable of causing a stomatitis but some are more prone to do so. These include antipyrine, aspirin, atropine, barbiturates, cinchophen, dilantin, penicillin, phenolphthalein, streptomycin, sulfonamides, thiouracil, and quite recently butazolidin[17]. The stomatitis may be nonspecific being characterized by erythema, edema, and shallow ulcerations. In those drugs causing agranulocytosis, a necrotic pharyngitis is seen.

Dilantin causes hypertrophy of the gums which begins as a bulging of the interdental papillae and may progress to such extent as to cover almost the entire dental surface.

Phenolphthalein as found in some laxatives, has caused fixed eruptions in the mouth appearing as red, purplish red or brownish spots. It has also produced

bullous and erosive lesions in the mouth and colitis may be associated with the stomatitis.

IV. Metabolic Disorders

The xanthomas that involve the mouth exhibit nonspecific yellowish papules, plaques or nodules occurring on the buccal mucosa, tongue, hard palate, and pharynx. These xanthomas include xanthoma disseminatum, xanthoma diabeticorum, xanthoma of Burger and Grutz, and xanthomas that are associated with biliary cirrhosis, hemochromatosis, obstruction of the common bile duct and chronic pancreatitis. Since these oral xanthomatous lesions cannot be distinguished clinically in the mouth or by oral biopsy, the oral lesions only evidence the existence of xanthomas in general. Differentiation depends upon the skin lesions, associated clinical manifestations and laboratory findings[18].

Amyloidosis may produce a stomatitis with macroglossia. The tongue shows translucent papules and purpuric spots; later furrows and shallow purulent or hemorrhagic necrotic ulcerations develop. The tongue becomes so enlarged as to cause dysphagia. Diagnosis is confirmed by biopsy, particularly of a gum lesion, which may show amyloid when the congo red test is inconclusive. In some cases, Bence-Jones proteinuria and multiple myeloma have been found[19].

Diabetic stomatitis occurs particularly in the uncontrolled diabetic who exhibits poor oral hygiene. The patient complains of dryness and burning in mouth and throat, the tongue is enlarged showing exaggerated fissures and a grayish coating. The gums are swollen, bluish red, bleed easily, and show shallow erosions. Dental caries is almost a constant accompaniment. Since this stomatitis may be the presenting symptom of diabetes, any stomatitis demands examination of the urine for sugar.

V. Avitaminoses

Malnutrition and vitamin deficiencies are seen in our country, even though we are the best fed people in the world. We see them in patients with severe wasting diseases such as tuberculosis, malignancies and ulcerative colitis. They occur in nutritional faddists, alcoholics, dope addicts, tramps and the inhabitants of "skid row". Such deficiencies were seen in our returned prisoners of war. It may be of interest to note here that vitamin deficiencies have been precipitated in malnourished prisoners of war during the period of refeeding[20].

Vitamin deficiencies are often apt to be multiple and evidence of same is prone to develop early in the mouth. When deficiencies are multiple, the picture is somewhat variable but usually the changes are chiefly due to lack of the Vitamin B fractions and Vitamin C. In consequence, the patient presents chelitis with fissuring in the angles; the tongue is inflamed, often covered by a dirty gray-

ish coating, the gums are spongy and bleed easily, and occasionally the buccal mucosa shows shallow grayish ulcerations.

Sjogren's syndrome occurs in middle-aged women and is characterized by abnormal dryness of mucous membranes, particularly the eye, nose, mouth, throat and larynx. It is thought to be due to a deficiency of Vitamins A and the B fractions. The buccal mucosa is dry, the tongue is dry, red and shows deep furrows. Perleche is frequently associated and the lips often show telangiectasia. The response to vitamin therapy is not dramatic.

Ariboflavinosis is manifested at the angles of the mouth, by fissuring, oozing and yellowish crusting. In severe cases the fissures become hemorrhagic. The tongue is inflamed, purplish red, fissured and the papillae are usually flattened. Associated symptoms include greasy seborrheic scales in the nasolabial fold, conjunctivitis and photophobia, failing vision, dysphagia, nausea and anorexia.

One must remember that chelitis may also be due to local causes such as malocclusion, poorly fitting dentures, lipstick and other allergic contactants.

Pellagra in its advance state with dermatitis, diarrhea, stomatitis, gastrointestinal neurologic and mental symptoms is easily recognizable. The disease may be insiduous in its onset, however, and may not progress to the full blown clinical picture. Since the mouth lesions begin rather early, their recognition is important. Malaise, irritability, depression, burning sensation of the tongue, anorexia, vague gastrointestinal distress and constipation or diarrhea usually precede the stomatitis.

Initial lesions on the tongue are small rounded smooth red spots on the tip, edges and base. Next superficial erosions occur and the lingual papillae atrophy and the classical slick "beefy" red tongue is manifested. The gums are inflamed, spongy, tender and bleed easily and the angles of the lips may show a fissured chelitis. While pellagra has been attributed chiefly to a deficiency of niacin, it seems probable that the deficiency also includes thiamin, riboflavin and tryptophane[21]. The response to adequate nutritional and vitamin therapy may be required for diagnosis of early pellagra.

Sprue causes as one of its early manifestations a burning sensation in the mouth with soreness of the tongue. The tongue is slightly inflamed, the fungiform papillae enlarged and small aphthous ulcerations may be scattered on the tongue, gums and cheeks. Later the characteristic raw, fiery red, smooth tongue develops. The associated symptoms and findings in the gastrointestinal tract and blood do not need recitation here.

Scurvy is not commonly seen in the United States today. Last year, however, the author picked up a case in a local government worker who was separated from his wife and subsisted upon a diet of coffee and sandwiches. The author

found a few early cases amongst medical officers overseas in World War II and recalls diagnosing of early scurvy in one of his fellow interns.

The gum involvement is rather characteristic and develops early. The gums are swollen, become dark purplish red, and bleed easily. The intradental papillae appear glistening and bulge forward, later they become necrotic and ulcerated. The tongue presents a dirty brownish coating and the rest of the oral mucosa is inflamed. In early scurvy, the response to Vitamin C may be a sort of therapeutic test. In our limited experience with this disease, the response was more pronounced when fresh citrus fruits were ingested.

VI. Blood Dyscrasias

Blood dyscrasias are prone to involve the mouth and the oral lesions frequently are the signs which draw attention to the underlying disease. Oral hemorrhages and petechiae may be the presenting symptoms for hemophilia, the purpuras, splenic anemia, agranulocytosis and the leukemias.

Hypochromic anemia is manifested by pallor of the mucosa, loss of papillae on the tongue, ulcerations, petechiae and hemorrhages.

Pernicious anemia, as previously mentioned, presents the well known smooth red waxy tongue with a yellowish tint to the rest of the oral mucosa. The other symptoms and signs of the disease are well known to this audience.

Agranulocytosis, in addition to hemorrhages shows an ulcerating stomatitis and pharyngitis which rapidly progresses to rather extensive necrosis, particularly of the fauces.

Leukemias and lymphoblastomas may involve the mouth either by nonspecific toxic manifestations termed "leukemids" or by specific neoplastic infiltrations. The nonspecific lesions are variable, tend to occur late and include purpuric spots, ecchymoses, ulcerations, necrotic areas and mucosa denudations. The specific infiltrations may be the first noticeable evidence of these diseases, hence their recognition is of great importance[22]. The hallmarks of leukemia in the mouth are gingival hypertrophy, ulceration and hemorrhage. The gums are painful, swollen, spongy, purplish, bleed easily and are necrotic but not inflamed. Monocytic leukemia is the leukemia most prone to have mouth lesions[23]. Several cases of lymphoblastomas have begun in the mouth as tumor masses or ulcerating granulomas of the palate or gums[24].

VII. Leukoplakia

Leukoplakia is a localized precancerous thickening of the mucous membranes, appearing as streaks, bands, or patches varying in color from dull whitish to a silver or opalescent white. It is much more common in males and usually

occurs after the age of 40. The most usual site is on the buccal mucosa at the level of the line of closure of the molar teeth, but may be seen anywhere in the mouth. Leukoplakia on the dorsum of the tongue used to be considered most often to be due to syphilis. "Smoker's patch" also appears on the dorsum of the tongue near its center. Undoubtedly trauma, such as from poorly fitting dentures, sharp projecting snags of teeth, chewing tobacco and smoking, particularly pipe smoking, play a role in the causation of leukoplakia. Every physician who examines the mouth should be "leukoplakia conscious". Early diagnosis and removal of causes of trauma in the mouth are the best means to prevent leukoplakia from becoming cancer.

VIII. Factitial Lesions

Factitial lesions of the mouth are extremely rare. They should be suspected in undiagnosed bizzare lesions, regular in outline, particularly round or teardrop shape; the tongue and cheeks are the most likely sites. The author recalls a case seen while in Army service in which bleeding gums of no discernible cause failed to respond to Vitamin C, until it was learned the patient would palm the pills and throw them out the window under the pretense of swallowing them. Recently, a case of factitial mouth lesions was observed here at Walter Reed and it is now in the process of being reported[25]. Some of the common substances that could be used to produce mouth lesions would include phenol, iodine, lye, toothache drops, and irritating liniments.

Therapy

Since the primary purpose of this paper has been to stress the value of oral diagnosis, very little has been said about treatment. In a general way oral therapy is directed towards the correction or removal of local abnormalities; adequate medical therapy of underlying systemic disease; and symptomatic and supportive measures. The first objective is best accomplished by close cooperation between the physician and the dentist or oral surgeon. We have found it advantageous to work with a dentist who has a great interest in oral lesions, and we examine many of our mouth cases using the physical facilities of his office. We plan our treatments together and both of us follow the progress of these patients.

The medical management of underlying disease obviously falls within the scope of the practitioner in whose field the disease happens to lie.

Symptomatic therapy includes the use of warm normal saline irrigations and the use of soothing mouth washes. We have found that suspending 2 or 3 aspirin tablets in 250 c.c. of the saline helps to relieve oral discomfort especially dysphagia. The cautious use of flavored sodium perborate is often helpful in our experience, particularly so in early leukoplakia, after improper dentures were corrected, but it must not be used too strong nor over too long a period of time.

Antibiotics, particularly the broad spectrum ones, are used both locally and systemically in infectious mouth lesions with benefit. The local use, however, is always attended by the chance of sensitization and the systemic use for trivial affections, as well as prolonged systemic use is to be avoided.

Supportive therapy entails measures to improve nutrition, correct anemia, and should include liberal use of multivitamin preparations, especially Vitamin C in the form of fresh citrous juices.

Conclusion

This presentation has been an effort to discuss some of the mouth lesions likely to occur in patients with gastrointestinal symptoms and some of the lesions which are likely to be met in the routine examination of patients. Not all mouth lesions could be discussed and we should like to suggest for additional reference the excellent monograph by Welsh[26]. This work has served as a guide in the preparation of this paper and should be of great value to anyone interested in oral lesions.

While many of the diseases we have discussed do not fall within the province of the gastroenterologist, either for definitive diagnosis or treatment, it is hoped that a cognizance of their clinical features will enable him to give greater help to patients who have oral disease.

REFERENCES

1. Sarnot, Bernard G.: in Disease of the Digestive System, by S. A. Portis, ed. 3, Philadelphia, Lea and Febiger, 1953, p. 338.
2. Jeghers, H., McKusick, V. A. and Katz, K. H.: Generalized Intestinal Polyposis and Melanin Spots of the Oral Mucosa, Lips and Digits, New England J. Med. **241**:993-1005 and 1031-1036, 1949.
3. Dodd, K., Buddngh, G. J. and Johnson, L.: Herpetic Stomatitis, Am. J. Dis. Child. **28**:907, 1939.
4. Dodd, K. and Riechman, J.: Herpes Simplex Virus Not the Etiologic Agent of Recurrent Stomatitis, Pediatrics **5**:833, 1950.
5. Samitz, M. H. and Greenberg, M. S.: Skin Lesions in Association with Ulcerative Colitis, Gastroenterology, **19**:476-479, (Nov.), 1951.
6. Robinson, H. M., Jr.: The Ocular-Mucous Membrane Syndrome, M. Clin. North America, (March 1951); 315-331.
7. Civatte, A.: Diagnostic histopathologique de la dermite polymorphe douloureuse ou maladie de Duhring-Brocq. Ann. dermat. et syph. **3**:1, 1943.
8. Lever, W. F.: Pemphigus, Medicine **32**:1-123, 1953.
9. McCarthy, F. P. and McCarthy, P. L.: Diseases of the Mouth, New England J. Med. **250**:493-498, 1954.
10. Harris, H. J.: Aureomycin and Chloramphemical in Brucellosis with Special Reference to Side-effects, J.A.M.A. **142**:161-165, 1950.
11. Brown, R., Hazen, E. L. and Mason, A.: Science **117**:609, 1953.
12. Wolfson, S. A.: Black Hairy Tongue Associated with Penicillin, J. A. M. A. **140**:1206, 1949.
13. Phillips, E.: J. A. M. A. **143**:1514, 1950.
14. Shaw, C.: Transitory Benign Plaques of the Tongue, Treatment with Penicillin, Arch. Dermat. & Syph. **56**:110-111, 1947.

15. Weiner, K.: Skin Manifestations of Internal Disorders, p. 654, St. Louis, C. V. Mosby, 1947.
16. Oatway, W. S. and Middleton, W. S.: Arch. Int. Med. **49**:870-876, 1932.
17. Charet, R. and Siegel, I.: Unusual Reaction Following Use of Phenylbutazone (Butazolidin), J. A. M. A. **151**:556-557, 1953.
18. Eusterman, G. B. and Montgomery, H.: Disorders of Liver and Extrahepatic Biliary Ducts Associated with Cutaneous Xanthomas and Hyperlipemia, Gastroenterology **3**:275-286, 1944.
19. Selikoff, I. J. and Robitzek, E. H.: Gingival Biopsy for Generalized Amyloidosis, Am. J. Path. **23**:1099, 1947.
20. Crawford, J. N. and Reid, J. A.: Nutritional Disease Affecting Canadian Troops Held Prisoners of War by the Japanese, Canad. J. Research, Sect. E. **25**:10, 1948.
21. Vilter, R. W., Mueller, J. F. and Bean, W B.: Therapeutic Effects of Tryptophane in Human Pellagra, J. Lab. & Clin. Med. **34**:109, 1949.
22. (a) Wenty, F. M., Anday, G. and Orban, B.: Histopathologic Changes in the Gingiva in Leukemia, J. Peridont, **20**:119, 1949.
(b) Fitzgerald, L. M.: Oral Lesions in the Leukemias, J. Iowa Med. Assn. **33**:424-426, 1943.
(c) Matheson, W. S.: Oral Symptoms in Acute Leukemia, Brit. Dent. J. **87**:264, 1949.
23. Burket, L. W.: Histopathologic Explanation for Oral Lesions in Acute Leukemias, Am. J. Orthodont. **30**:516-523, 1944.
24. Thoma, K. H.: Oral Pathology, 1484-1487, St. Louis, C. V. Mosby Co. ed. 3, 1950.
25. Col Robert B Shira, Chief of Dental Service, WRAH, Personal Communication to the author.
26. Welsh, A. L.: Diseases of the Mucous Membranes, St. Louis, Educational Publishers, Inc., 1942.

Discussion

Dr. I. Snapper:—I would like to elaborate on two points connected with the interesting paper of Dr. Osbourn. In ulcerative lesions of the mouth, irrespective of the cause of the ulceration, the spirochetes in the mouth always proliferate. This secondary infection with spirochetes and fulsiform bacteria can be favorably influenced by neoarsphenamine. Thus, nearly all ulcerations in the mouth can be, at least partially, improved by local application of neoarsphenamine in glycerine. It is better not to use one of the modern antibiotics for this purpose. Administration of antibiotics as shown by Dr. Osbourn may favor the development of fungus infections and extensive spread of thrush may ensue.

My second remark is of minor importance. Dr. Jeghers himself opposes the designation of Jeghers' disease, because my old resident, Peutz, from the Hague in the Netherlands, described intestinal polyposis with pigmentation of the mucous membrane of the mouth before Jeghers did. Jeghers, however, first described this syndrome in this part of the world.

It is certainly significant for the change which medicine has undergone in the last 30 years, that Dr. Osbourn has not even mentioned syphilitic lesions of the mouth. We do not see anymore the deeply scarred tongues of the venerable old dowagers who had syphilis when they were young, but who were so respectable when they were old that nobody even dared to bring up the possibility of such an unfashionable disease.

SURGICAL TREATMENT OF DIVERTICULITIS COLI*

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and

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Because of the high mortality associated with colon resection and the lack of understanding of its proper place in the treatment of diverticulitis, surgical treatment in the past was reserved for the complications of diverticulitis. In addition, the surgical procedures employed were palliative rather than curative, in the hope that diverticulitis or its complications would not recur.

Since the introduction of chemotherapy and antibiotics, modern methods of anesthesia, whole blood, and a better understanding of fluid and electrolyte balance, the surgical treatment of diverticulitis coli has improved. The goal of modern surgical treatment is to resect the offending segment of colon rather than to merely drain an abscess and/or perform a proximal colostomy. Adequate proof of the need for resection to cure diverticulitis is given by Smithwick[1] who showed that only about 46 per cent of the patients were living and well following measures other than colostomy or resection, 63 per cent were living and well following proximal colostomy without resection, and 76 per cent were living and well following resection. The late mortality rate, without resection, was 9 per cent while that following resection was 3.7 per cent. These general figures have since been substantiated by other authors[2,3]. Pemberton[2] reports that closure of a colostomy without resection of the offending segment of colon has resulted in recurrence of symptoms of diverticulitis in about two-thirds of his patients.

In recent years the indications for surgical intervention have been expanded. A number of clinics are now beginning to consider recurrent attacks of diverticulitis a complication. Increasing numbers of these patients, during a quiescent period, are being subjected to primary one-stage resection of the offending segment of colon. The results in these patients have thus far been gratifying.

Incidence:—The true incidence of diverticulosis is difficult to evaluate, since all sources of information possess some element of selectivity. Most authors agree it occurs in 5 to 10 per cent of the population over 40 years of age. It is often associated with obesity, is uncommon under 40 years of age and rare under 30. In about one third of the patients studied, associated lesions of the gastrointestinal tract were discovered[4]. Approximately 10 to 20 per cent of the

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patients with diverticulosis will develop diverticulitis, but this figure depends on the criteria for diagnosis and how long the cases are followed. There is no conclusive proof that medical management will prevent the development of diverticulitis in a patient with diverticulosis.

Location of Diverticula:—The sigmoid colon is involved in about 75 per cent of the cases. Only about 2 per cent of diverticula occur in the right colon. While most diverticula are multiple, acquired, and found at the mesenteric border of the colon, cecal diverticula are usually single, congenital, and occur on the anterior or lateral wall of the cecum.

Indications for Operation

1. *Intractability:*—The probability of serious complications, which result in repeated hospital admissions and multiple operations with prolonged disability, has led many investigators[5-8] to make a careful study of patients whose disease has shown a progressive pattern of continued inflammatory activity in spite of adequate medical therapy. It is in this situation that elective one-stage resection of the offending segment of colon has been carried out with a very low mortality rate and a marked reduction in economic loss. As compared to patients subjected to staged procedures, where the average hospital stay was 305 days, the patients remained in the hospital only about 38 days[9]. This method of management also serves to eliminate the possible presence of carcinoma.

In our experience the amount of pathologic abnormality demonstrated at operation in patients who have had only mild but recurrent symptoms of diverticulitis has been surprising. It has not been unusual to find adherent loops of small bowel and markedly thickened scarred sigmoid wall, and one wonders at the mildness of the patient's complaints. It is our opinion that resection of the left colon is necessary if multiple diverticula are present in this segment. It has been shown, however, that resection of the sigmoid colon only has resulted in very few recurrences, even though residual diverticula remain. This is due, presumably, to straightening of the colon and the elimination of stasis[3]. It is important that no tension exists on the suture line and that the anastomosis be made between bowel ends which are free from inflammatory reaction.

The indications for resection in uncomplicated diverticulitis are: 1. repeated attacks while on good medical therapy, 2. development of urinary symptoms in the presence of diverticulitis, 3. severe persistent deformity of the colon on barium enema examination, 4. suspected cancer, and 5. recurrent bleeding[7].

During the past five years at Walter Reed Army Hospital, only 15 cases of diverticulitis coli have been treated surgically. Eleven of the 15 had sigmoid resections, and of these, 7 underwent primary resection. There was no hospital mortality and no serious postoperative complications. Forty-five per cent of the colon resections were done for recurrent diverticulitis.

2. *Hemorrhage:*—The incidence of hemorrhage in diverticulosis ranges between 5 and 6 per cent and in diverticulitis it has been estimated by various authors[10,11,12] to be between 8 and 17 per cent. In carcinoma of the colon, bleeding occurs in about 62 per cent, thus emphasizing the fact that the case should be treated as carcinoma until proven otherwise. Persistent daily bleeding has been shown to be more suggestive of carcinoma. Conservative therapy will usually control the hemorrhage. Surgical treatment, consisting of early primary resection, is indicated in recurrent hemorrhage, uncontrolled hemorrhage, and in cases where it is impossible to rule out carcinoma[13].

3. *Obstruction:*—Obstruction is usually the end-result of repeated attacks of diverticulitis and results from the stenosing scar tissue in the wall of the colon and pericolic tissues. In many cases, it is clinically impossible to distinguish diverticulitis from carcinoma, and even at operation 25 per cent of cases cannot be diagnosed by gross examination. Biopsy of a portion of the mass is unreliable and it is necessary in many cases to resort to a more complete microscopic examination in order to make the correct diagnosis. Even the pathologist, on gross examination in the laboratory[2], will find it impossible in some cases to distinguish between the two.

Surgical treatment depends upon the completeness of the obstruction, the absence of signs of malignancy, and the general condition of the patient. If the obstruction is incomplete, conservative treatment may be elected and later, when the acute process has subsided and the colon has been prepared with antibiotics, a primary resection can be done. If the obstruction is complete, and malignancy is suspected, a right transverse diverting colostomy should be done and resection carried out within two weeks. If malignancy can be ruled out clinically it might be best to wait one or two months before attempting a resection. Each case, however, should be treated individually.

4. *Perforation:*—Perforation is the most common indication for surgery. Acute perforation with diffuse peritonitis can occur, but, because of the location of the diverticula at or near the mesenteric border, this rarely happens. The usual perforation occurs slowly and is effectively walled-off by the surrounding pericolic tissues. When treated conservatively it usually drains spontaneously into the bowel. It may, however, lead to fistulae formation to the bladder, vagina, small intestine, or perineum. Most of the deaths from diverticulitis are caused from perforation. Unless contraindicated by other disease, a proximal diverting colostomy, with later resection, should be done. If possible, drainage should be avoided except in the case of acute diffuse perforation[7].

5. *Diverticulitis of Cecum:*—Diverticula may extend from the cecum to the sigmoid but those in the right colon rarely become inflamed. About 2 per cent of the patients with diverticulosis exhibit diverticula in the cecum[14]. They occur in younger patients, the average age being 40 years. The symptoms and signs of cecal diverticulitis are usually those of acute appendicitis, except

that nausea or vomiting occurs in only a few patients. Ordinarily, the preoperative diagnosis is not suspected if the patient has not had a previous appendectomy. At operation the diagnosis may often be confused with a perforating carcinoma of the cecum, and resection of the right colon under these conditions has resulted in a mortality of about 10 per cent. If the diagnosis can be made, closure by inversion or following excision should be done. A drain may be desirable. The mortality following this procedure is about 1.6 per cent[15]. Resection of the right colon should be undertaken only when the diagnosis of cancer cannot be ruled out and then only after adequate bowel preparation. This latter may be accomplished on the operating table with 1 per cent neomycin.

6. *Cancer:*—Since the sigmoid colon is involved in about 75 per cent of the cases of diverticulitis, and because 17 per cent of carcinoma of the colon is located in the sigmoid, the question of differentiation often arises. It has been shown in the literature[16] and by our experience that there is no causal relationship between chronic diverticulitis and carcinoma. The presence of the cancer is purely coincidental. The important point is that where suspicion of cancer is present, staged procedures should be abandoned and, after thorough bowel preparation, a more aggressive attitude taken. Bleeding, weight loss, obstruction, and anemia all point toward cancer. Sigmoidoscopic examination is valuable, but a good x-ray examination by barium enema is of more use. Even with these aids an accurate differential diagnosis may be very difficult.

7. *Fistulae:*—Fistulae may occur to small bowel, bladder, uterus, vagina, perineum, and to the skin of the abdominal wall. They are much more frequently seen in the male, since the uterus and adnexa afford some protection in the female. Approximately 23 per cent of surgically-treated cases of diverticulitis have vesico-sigmoid fistula[3]. Fistulization is usually secondary to formation of an abscess which may rupture either externally or into an adjacent viscera. The symptoms of vesicosigmoid fistulae are prolonged in duration and consist of urinary frequency, burning, fever, and suprapubic pain. Later, pneumaturia and the passage of fecal material in the urine occurs. Most fistulae can be demonstrated by cystoscopy, but few can be seen on barium enema examination. Most fistulae will eventually close following a proximal diverting colostomy and adequate antibiotic therapy. Delayed resection is indicated when the local inflammatory reaction has subsided. A Foley retention catheter is left in the bladder for decompression for 7 to 10 days.

Summary

1. Surgical treatment of diverticulitis coli should consist of resection of the involved segment of colon, either primarily or in stages.

2. Recurrent attacks of diverticulitis may be considered as a complication and should be treated during a quiescent period by primary resection after adequate bowel preparation. This method of management has resulted in a low mortality and a marked reduction in economic loss to the patient.

3. Although there is no causal relationship between chronic diverticulitis and cancer, carcinoma should be strongly suspected in patients who have persistent daily bleeding, weight loss, obstruction, or anemia. These patients should be treated as cancer patients until proven otherwise. The differential diagnosis between chronic diverticulitis and carcinoma of the sigmoid colon is most difficult. Surgical intervention should not be delayed.

REFERENCES

1. Smithwick, R. H.: Experiences with the surgical management of diverticulitis of the sigmoid. Ann. Surg. **115**:962, 1942.
2. Pemberton, J. de J., Black, B. M. and Maino, C. R.: Progress in the surgical management of diverticulitis of the sigmoid colon. Surg., Gynec., & Obst. **85**:523, 1947.
3. Mayo, C. W. and Blunt, C. P.: The surgical management of the complications of diverticulitis of the large intestine. Analysis of 202 cases. S. Clin. North America **30**:1005, 1950.
4. McGowan, F. J. and Wolff, W. I.: Diverticulitis of the sigmoid colon. Gastroenterology **21**:119, 1952.
5. Bartlett, M. K. and McDermott, W. V.: Surgical treatment of diverticulitis of the colon. New England J. Med. **248**:497, 1953.
6. Boyden, A. M.: The surgical treatment of diverticulitis of the colon. Ann. Surg. **132**:94, 1950.
7. Welch, C. E., Allen, A. W. and Donaldson, G. A.: An appraisal of resection of the colon for diverticulitis of the sigmoid. Ann. Surg. **138**:332, 1953.
8. Babcock, W. W.: Diverticulitis. Rev. Gastroenterol. **8**:77, 1941.
9. Lewis, J. E., and Hurwitz, A.: Surgical treatment of sigmoid diverticulitis. Surgery **33**:481, 1953.
10. Ransom, H. K.: Diverticulitis of the colon. Gastroenterology **26**:12, 1954.
11. Fansler, W. A.: Diverticulosis and diverticulitis. Tr. Am. Proct. Soc. **41**:231, 1940.
12. Rosser, C.: The surgical management of diverticulitis. Southern M. J. **32**:1203, 1939.
13. Quinn, W. C. and Ochsner, A.: Bleeding as a complication of diverticulosis or diverticulitis of the colon. Am. Surg. **19**:397, 1953.
14. Unger, H. M.: Solitary diverticulitis of the cecum. Am. J. Surg. **85**:780, 1953.
15. Lauridsen, J. and Ross, R. P.: Acute diverticulitis of the cecum. A.M.A. Arch. Surg. **64**:320, 1952.
16. Rowe, R. J. and Kollmar, G. H.: Diverticulitis of the colon complicated by carcinoma. Internat. Abstr. Surg. **94**:1, 1952.

Discussion

Dr. I. Snapper:—Diverticulitis is also oftentimes the cause of fever of unknown origin. In diverticulitis of the colon, occasionally communications exist between a small branch of the inferior mesenteric vein, and one or more diverticula. Every time this communication breaks open chills and fever develop. In these conditions there is leucocytosis but the blood culture is always negative, because the bacteria are filtered off by the liver. The microorganisms can only reach the peripheral circulation when abscesses have formed in the liver. In this terminal stage the blood cultures become positive.

The diagnosis, of course, is difficult to make, as Major Jay has explained. Forty per cent of the persons over 40 years of age have diverticula. How can one decide whether a diverticulum occasionally communicates with a root of

the portal vein? The smallest quantity of barium outside the lumen of the sigmoid indicates the presence of diverticulitis with perforation near the insertion of the mesenterium. Thus in a patient in whom extraluminal barium outside the sigmoid can be discovered a walled-off perforation of the diverticulitis is probably present.

I would therefore like to add to Dr. Jay's list of surgical indications, "fever of unknown origin due to diverticulitis".

Dr. O. H. Wangensteen:—I believe the attitude that Major Jay presented today is one that is rapidly gaining ground among surgeons with reference to what one should do about diverticula of the colon. I said diverticula and not "diverticulosis" or "diverticulitis". In other words, I have the feeling that we have been drawing fine distinctions in some situations which do not exist. I think it highly unlikely that patients could have a large number of diverticula in the colon and not have some symptoms from them.

Every now and then I operate upon a patient for cancer of the stomach, and in putting my hand down into the pelvis, I feel little dangles of diverticula, occupied by small fecaliths suspended on the exterior of the colon. Interrogation usually persuades you that the patient is not asymptomatic. In other words, we are employing the word "diverticulitis" in too limited a sense to imply the presence of a complication such as inflammation, abscess, fistula or obstruction. In other words, I believe that the presence of multiple diverticula in the colon suggests that the owner thereof probably suffers some mechanical embarrassment to normal colic contractility in consequence. Moreover, careful interrogation usually discloses that these diverticula are not entirely asymptomatic.

As time goes on, reports like this one of Major Jay will demonstrate that segments of the colon can be excised with a relatively low operative risk. This is not an operation to be done for chronic constipation, because it does not remove the right segment. Sir Arbuthnot Lane of Guys Hospital in London advocated and practiced excision of the left colon for epilepsy, exophthalmic goiter and a number of other conditions 40 years ago, all of which conditions Lane believed had their origin in chronic constipation.

If a surgical attack upon the problem of chronic constipation is contemplated, one should excise the right colon and about 50 to 75 cm. of the ileum—these two segments are the "water-wringer" of the intestine. Such an operation will surely cure chronic constipation. I confess to having done the operation a few times. I have seen patients more pleased with the resultant cure of the constipation than with the incidental cure of a simultaneously existing colic cancer. My associates Drs. Kremen, Linner, and Nelson (Annals of Surgery, **140**:539, 1954) have shown that excision of long segments of the ileum is not nearly as well borne by the dog as is excision of similar lengths of jejunum. The same undoubtedly holds true for man. In fact, excision of too much ileum

together with the right colon, is bound to result in a diarrhea which will persist until adaptive mechanism recorrects the situation.

There is not a single paper on cancer of the colon or rectum listed in these symposial discussions. I am going to seize upon the opportunity in consequence to extend Major Jay's observations on diverticulitis to include total and subtotal colectomy for colic cancer. Since 1946, I have been performing total or near-total colectomy quite regularly for cancer of the left colon, anastomosing the rectum or the iliac colon below the sacral promontory to the ascending colon or to the terminal ileum. In the intervening years, 80 such cases have been done. Polyps have been found in 38 per cent of the patients which would not have been removed by hemicolectomy or by segmental resection. In 18 per cent of the patients, including those for whom a partial colectomy had been done for a cancer of the colon, a few months to a year previously, another occult cancer was found. These findings suggest that total or near total colectomy for colic cancer as a primary operation is going to uncover a number of occult precancerous lesions (polyps) as well as additional cancers whose presence had not been suspected. The Hospital mortality was 5 per cent—a mortality which is not out of line with hemicolectomy or segmental resection. As time goes by, I believe that surgeons will find total or near total colectomy for colic cancer an acceptable operation, especially for lesions of the left colon. For cancers distal to the hepatic flexure, we have been doing this procedure quite routinely since 1946. For lesions of the cecum, it is not quite so adaptable because in order to remove effectively the lymphatic drainage area, it is necessary to remove some ileum. If not more than 20 cm. of ileum is excised, total colectomy is not followed by persistent bothersome diarrhea. In other words, total or near total colectomy is a satisfactory operation too for some cecal cancers. I have in a few patients preserved just enough of the cuff of the cecum and ascending colon to effect the anastomosis, feeling that preservation of the ileocecal valve is a good thing. In fact, we have no patients with persistent diarrhea following total or near total colectomy in which the ileocecal valve and sphincter were preserved.

I commend Major Jay for this report. It seems that colectomy should be done more frequently for diverticula of the colon; that we should not differentiate too sharply between diverticulosis and diverticulitis, that careful interrogation will suggest that all patients having multiple diverticula in the colon have some symptoms therefrom. And finally, I would add that, whereas open anastomoses seem to be gaining headway in some surgical clinics, I still feel that the closed anastomosis is by all odds the best operation. It does not need preoperative antibiotic preparation of the colon. Cleansing enemas will suffice. The experience of our Clinic suggests the lowest mortality from colon resection was over the 2-year interval from 1941-1943, when no intestinal antibiotic preparation was available. Over that period of time, colectomy was done in 61 cases with one death—a mortality of 1.6 per cent (Surgery, 14:403, 1943). We have not equalled that record since.

DISEASES OF THE PANCREAS*

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It is indeed a pleasure to take part in this Postgraduate Course and to talk to you on the subject of diseases of the pancreas. I appreciate your cordial invitation. May I take a moment to pay tribute to Dr. Julius Friedenwald, a pioneer in Gastroenterology, with whom I was associated for many years, who in 1941, the year of his death, reported on this same topic before this Association. In reviewing "Diseases of the Pancreas" over the intervening years, I find that it continues to be a rather difficult and puzzling subject and that it continues to offer a challenge both diagnostically and therapeutically. I believe, however, that very important, though not dramatic, advances are being made. When I talk of diseases of the pancreas, it is not my intention to take up your time discussing the anatomy of the pancreas which, as you know, consists of structures which have to do with its internal secretion and structures which have to do with its external secretions. Nor do I intend to spend too much time on the physiology of the pancreas, important as it is in the particular conditions which we are about to discuss. It is rather my intention to devote most of our time to three diseases: acute pancreatitis, chronic relapsing pancreatitis, and carcinoma of the pancreas.

Acute Pancreatitis

Acute pancreatitis is a remarkable disease and has often been qualified by such terms as catastrophic, a word which makes clear the seriousness of the condition. Before Reginald Fitz' description in 1889, there was no clear-cut understanding of the condition. Opie's contribution in 1901 of the "common channel" theory for the production of acute pancreatitis was a very important step forward. Later in 1936 Rich and Duff described the vascular changes which took place in acute pancreatitis as a result of the escape of pancreatic ferments and how, as direct consequences, hemorrhage, digestion and necrosis followed.

Historically four periods can be delineated in the development of our knowledge of acute pancreatitis. First there was the era when most of our knowledge came from the pathologist; this often indicated that the patient had not survived. Then later, there was the period of surgical interference with its high mortality rates. There followed the period of medical conservative therapy which is now developing into its logical follow-up; that is, that surgery

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follows medical treatment at a selected time and for certain specific reasons or complications.

As noted, it was in 1889 that Reginald Fitz gave his clear-cut description of the gross pathology and symptomatology of acute pancreatitis but he did not present, (nor up to that time had there been), a clear distinction into the 3 or 4 pathogenic types of acute pancreatitis. For example, we know now that approximately 75 per cent of patients with pancreatitis have so-called interstitial pancreatitis associated with edema of the organ and we know that the majority of these patients, if treated properly and conservatively will do well. Then about 12½ per cent of patients have a real catastrophic pancreatitis which is characterized by a more severe clinical picture and represents a necrosis or hemorrhagic state of the organ and finally, there is the suppurative stage of pancreatitis which accounts for the remaining 12½ per cent. The latter is often associated with abscess and pseudocyst formation. For the record Siler and Wulsin cite an 18 per cent mortality which they stress is lower than that usually reported in the past. Also, they point out that the mortality for patients with interstitial pancreatitis was 4.8 per cent; with hemorrhage and necrosis, 84.7 per cent, and with suppuration or pseudocyst, 28.6 per cent.

In the early development of the clinical picture of pancreatitis, the clinician is not sure whether he is dealing with one type or another. He only knows that he is presented with a patient who has very severe abdominal pain perhaps with fever and who seems to be in more or less shock. The pain may be atypical or may be located in the epigastrium or in the left upper quadrant or may be of a boring type penetrating through the epigastrium to the back. On physical examination the findings are often not consistent with the severity of the patient's illness. In other words, the abdomen is usually not rigid as in perforated ulcer or acute gallbladder or peritonitis. There is not the typical pain of intestinal obstruction or coronary occlusion with which it may be confused; nor is it the pain of diaphragmatic pleurisy or pneumonia but all these conditions must be differentiated from acute pancreatitis. It has been said by Bockus and others that one cannot make a diagnosis of acute pancreatitis on the basis of clinical examination alone; that is, by history and physical examination but each of these will contribute to the proper diagnosis if pancreatitis is kept in mind. In order to make a definitive diagnosis certain additional procedures are indicated and among them the serum amylase stands foremost.

Increasing awareness of the value of the serum amylase test has developed in recent years thanks to the persistence of Elman and others. If this test is done in the presence of all types of abdominal pain it will prove of great value in arriving at a diagnosis of acute pancreatitis. One report indicates a 16-fold increase in diagnosis since the adoption of its routine use, but to this day Elman tells us that the importance of this test has not been generally

appreciated. He and others have also made it clear that since they have been using the test, pancreatitis diagnoses have increased showing how much more common is this condition than heretofore supposed. The serum amylase test can be done promptly and within the hour the result can be known. If the value is above 500 there is usually little doubt that pancreatitis exists. The normal for the Somogyi serum amylase is from 40 to 140 units (other limits have been given). Now, in certain diseases of the salivary glands and sometimes in perforation of an ulcer into the pancreas (which often amounts to a pancreatitis) high values appear. I have one patient in my own group, (a lady who was supposed to have had a cerebral accident but in whom cholecystitis and cholangitis existed) on whom we did a serum amylase which was above 2,000. When she was autopsied, there was nothing wrong with her pancreas so far as we could see. There are therefore occasional, though rare, exceptions to the fallibility of the test.

The test is only positive during the period of pain which means that when the pain subsided, the serum amylase drops to normal. Amylase values, however, are reported to remain elevated in peritoneal exudates for a longer period of time and this test is being utilized to great advantage in some clinics. There are clinics in which the serum lipase is used as a diagnostic procedure since its positivity does not depend upon the immediacy of pain. The antithrombin titer proposed by Innerfield is proving to be a valuable procedure. Also a calcium determination is important because if the calcium is as low as 7 this would indicate a serious pancreatitis. The calcium falls, incidentally, because the lipase ferments and calcium react to form calcium soaps and in this process use a great deal of calcium, accounting too for the calculi which appear later. X-ray studies can be helpful if localized dilated loops of bowel are seen or if calcifications are visualized. These patients are not usually well enough to undergo barium studies but when these are done, extrinsic pressure defects and other deformities brought about by the proximity of the affected pancreas to the neighboring stomach and duodenum may be very helpful to the trained observer in making a diagnosis. Finally, electrocardiographic evaluation is essential in the differential diagnosis as well as in the diagnosis itself.

I would like to take a moment to discuss the etiology of pancreatitis. If one reviews the literature (and many conflicting statements are presented), one finds that the disease is more common in men than in women. There are some exceptions in certain reports. It is the belief of Bockus and others that alcohol is one of the primary etiological factors and yet there are many large groups of alcoholics in whom pancreatitis is not found but it is true that the likelihood of finding pancreatitis is greater in alcoholics than in nonalcoholics. It has also been thought for a long time that gallbladder disease precedes pancreatitis and yet we know that gallbladder disease is more common in women than in men. Moreover, I shall tell you later when I talk of chronic

relapsing pancreatitis that gallbladder disease often follows the development of pancreatitis.

We come now to the treatment of acute pancreatitis, a treatment which has evolved over a period of years on good sound physiological principles. In pancreatitis, every effort must be made to put the pancreas at rest. First, however, the patient's pain must be relieved by Demerol and not morphine, since the former is primarily spasmolytic whereas the latter is spasmogenic and may occasionally aggravate the pain rather than relieve it; also an increase in serum amylase is often found after the use of morphine indicating spasm of the sphincter of Oddi. One would give sufficient Demerol then to relieve the patient of pain. One would restore fluid and electrolyte balance. Since a great deal of fluid is lost, one would not hesitate to give blood and normal salt solution and one would give glucose in 2.5 per cent to 5 per cent solutions (with insulin if there is need for it). Since it has been found that a high percentage of plasma is lost in the retroperitoneal tissues as a result of inflammatory edema it should be replenished and plasma is perhaps the best fluid to give since it and blood possess antitryptic activity which may partially neutralize the trypsin released into the blood stream during an attack (Farrar).

We then proceed to a plan of pancreatic rest. This means that there would be no food by mouth and that the stomach would be kept empty by Wangensteen or other drainage. One must make sure that the tip of the tube does not extend beyond the pylorus since we are trying to drain hydrochloric acid which stimulates pancreatic secretions through the secretin mechanism. Along with this, alkalis should be given to doubly assure counteraction of hormonal stimuli. One would interrupt vagus action to the pancreas by giving atropine or one of the anticholinergic drugs. Having accomplished pancreatic rest, one would supply calcium if needed and take care of infection by the use of antibiotics if indicated. Other supportive and symptomatic measures would, of course, be taken as for example, the use of a low fat diet and pancreatin once the acute phase had subsided. On such a plan for a few days the patient would pass from the acute phase to the post acute phase which, when it is stabilized, would naturally lead to the treatment of the complications of acute pancreatitis. These will be mentioned when we talk of chronic relapsing pancreatitis. I must confess that though surgery is dangerous and usually not indicated during the acute episode, we have occasionally resorted to it in some of our patients either because there was persistence of pain or because we feared that some condition other than pancreatitis existed.

Chronic Relapsing Pancreatitis

The next topic to be discussed is chronic relapsing pancreatitis. There is quite a story connected with the development of this picture but I would like to give credit to Comfort, Gambill and Baggenstoss, who in 1946 actually

introduced the term "chronic relapsing pancreatitis" which is, as the name implies, a chronic pancreatitis in which relapses occur. Until this time there was some reason to believe that acute pancreatitis (edema, hemorrhage, necrosis, suppuration), pancreatic stones and calcifications, abscesses of the pancreas, pseudocyst formations, atrophy of the pancreas and nodular pancreatitis were in some way associated, but I think Comfort's group, for the first time, really indicated very clearly that this was the evolution of one disease process. It was in 1946 that they reported their series of 29 patients with chronic pancreatitis *without* gallbladder disease and then in 1948, another series of 27 patients *with* gallbladder disease. Careful detailed observations indicated to them that there were hardly any significant differences in these two groups except that when gallbladder disease was present it had to be eradicated and it was their judgment, since borne out, that gallbladder disease can just as well follow pancreatic disease as vice versa.

There are two clinical pictures to look for in chronic relapsing pancreatitis. One may be described as an awareness that a patient has been having recurring attacks of abdominal pain (acute pancreatitis). Up to this time, however, the clinical picture has not developed to the point at which there is such interference with islet cell function as to bring about a picture of some degree of diabetes nor that the external secretions have become so impaired as to produce interference with fat, carbohydrate, and protein metabolism in the form of creatorrhea, steatorrhea or the effect of deficient amylase. This would show itself by the presence of bulky fatty stools with undigested protein fibers and evidence of inadequate carbohydrate break-down. In the textbooks, one looks for this latter clinical picture but I daresay that it will be the former picture indicating early diagnosis rather than the latter indicating the situation when the pancreas had become more or less atrophied which will become more common as our diagnostic acumen develops.

In addition to these two clinical pictures, one would look for some of the associated changes such as the presence of a mass in the epigastrium; this is usually the result of pseudocyst formation. One would also look for evidence of calculi. In helping to make a diagnosis those methods of investigation used in acute pancreatitis would be utilized also. In addition, x-ray studies might show the presence of stones in the pancreas, biliary tract disease, or indirect pressure changes on the gastrointestinal tract.

I would like to give three brief case reports at this point. I recall a patient who, some years ago, had excruciating jack-knife pains which did not respond to treatment so that operation became imperative. At the operation, he was found to have chronic pancreatitis and a cholecystostomy was done. He was allowed to drain for a reasonable period of time and then was discharged from the hospital. He got along fairly well but his pain returned and again it was difficult to relieve him and he was again hospitalized and chole-

cystogastrostomy was done. At this time the surgeon examined the pancreas, described it as nodular and malignant and so told the wife. The patient recovered from this operation and after a short time began to have pain again. Meanwhile, he was collecting full disability from the insurance company on the basis of carcinoma of the pancreas. One day on examination, his heart was discovered to have shifted to the opposite side and later he was found to have fluid in his *right chest*. This fluid, when removed was observed to be bloody and we continued to remove bloody fluid from his chest for quite some time. Since his pain was severe, it was decided to do a right splanchnicectomy. He developed a fistula and began to spit blood but in time, all this cleared. The patient now looks robust but continues to have periodic pain. I regret to say he once had become a narcotic addict but has since overcome this habit. This complicated situation has left only the insurance company dissatisfied since they are continuing to pay full disability; however, I think he is entitled to it because he has a disabling disease.

The next patient was collecting about 80 per cent disability from the Veterans Administration for neurosis and as you know, when the V. A. pays this much disability, they really believe the patient is neurotic. One night about 11 o'clock, the family called to say that if there ever was an emergency, this was one and they wanted the patient seen. He had not been under my care except for a couple of office visits but when I saw him, I knew at once that this was not neurotic behavior and it was, as if suddenly, clear that he was having an acute exacerbation of chronic pancreatitis. He was not relieved by strong hypodermics and had to be hospitalized. While in the hospital a mass appeared in his mid-epigastrium. The surgeon told us it was malignant and urged him to be operated upon but he refused. He went home but after a week, called me to say that his pain was so severe that something would have to be done; he was hospitalized for operation. At operation he had extensive pancreatic necrosis so that the necrotic material had to be scooped out. Interestingly enough, he was closed and did not drain and made an uneventful recovery. Some weeks later, however, he reported that another lump had appeared above his navel. When examined, there was no question that he had another pseudocyst and we decided to watch it. After a few days and again late at night, he called to say that the thing had burst and he was drenched. In other words, he had fistulated not only to form a pseudocyst but through his abdominal wall. It has now healed and he has been moderately well since, but continues to have periodic pain of varying degree.

The third patient was a lady who was having typical attacks of gallbladder colic. She developed diabetes with large quantities of sugar in the urine and blood, only she did not respond to large doses of insulin and became worse until she succumbed to her condition. I mention this patient because it is often stated in the literature that diabetes associated with chronic pancreatitis

is mild but I can tell you from personal experience that it can be very severe, perhaps not so much symptomatically as in its physiological control.

Having described chronic relapsing pancreatitis in this way and assuming that the diagnosis is made, what can we do for these patients? There are three types of treatment. One is conservative medical, the other, palliative surgery and the other, radical surgery. Perhaps it is helpful to realize that it takes about ⅞ of the pancreas to carry on its fat function, at least ½ of the pancreas to carry on its protein function and about 10 per cent to carry on carbohydrate function (McGavack).

Conservative medical treatment consists of a low fat diet. In addition to the low fat diet, we can give pancreatin in doses of from 5 to 25 gm. a day. Alkalis and antispasmodics are a part of conservative medical therapy and a pain relieving medication such as Demerol should be on hand; narcotic addiction is to be guarded against.

Under palliative surgery, we would do a cholecystostomy, cholecystogastrostomy or cholecystduodenostomy or sphincterotomy. In the hands of Doubilet and his group in New York, the latter operation has been remarkably effective. Some have been opposed to it because they feel it promotes ascending infection. The operation and its rationale, however, is based on the belief that spasm of the sphincter of Oddi is responsible for the regurgitation of material into the pancreatic tissues.

Under both palliative and radical surgery, one would list gastroenterostomy where duodenal obstruction is present or subtotal gastrectomy to remove the acid bearing part of the stomach thus abolishing this hormonal stimulus to pancreatic secretion. Under nerve operations, one would list blocking or severance of the sympathetic nerves to reduce vascular spasm and pain and to bring about better circulation. Under definitive surgery, some of them radical, one would list the removal of pancreatic stones or calcifications, the removal of, or the internal or external drainage of pancreatic cysts or the partial or total removal of the pancreas. A few words of comment may be in order on the drainage of pancreatic cysts. Sometimes these cysts are drained to the exterior and continue to drain for an indefinite period of time. Large amounts of pancreatic secretions are lost but rarely lead to electrolyte imbalance, dehydration, perhaps weight loss and interference with normal digestion because these are not true pancreatic fistulae and the secretions are rarely activated. If external drainage persists too long, the fistula can be implanted into the stomach or jejunum and this is considered by some to be a satisfactory operation. Internal drainage by cystojejunostomy by the Roux-Y technic is advocated by some surgeons to be the treatment of choice. Marsupialization of the cyst also has been found very satisfactory.

If a large part of the pancreas is removed one is confronted with the problem of adequate digestion and the provision of sufficient secretions. The

loss of pancreatic external secretions can be made up, in part, vicariously or by replacement in medicinals or by a small nubbin of pancreas left proximate to the duct. Finally it should be noted that the type of diabetes associated with a total pancreatectomy is not as severe as some of the ordinary diabetic states.

Carcinoma of the Pancreas

You will recall that in the beginning of this presentation on diseases of the pancreas, I told you that I would select the three which are most common. This naturally leads us now to a discussion of carcinoma of the pancreas. Since this is a summary of my remarks before your college, I will try to point out some salient observations. The first is that on the whole, people with carcinoma of the pancreas are often called neurotic for an average of 7 months before it occurs to the physician that the patient may be suffering from a serious disease. In fact, I have on record a patient who consulted me in November, 1950 for nausea at the age of 72. She responded well to symptomatic therapy but at the time of her very thorough examination, the x-ray showed a nonfilling gallbladder. Our interest, however, was directed to a displacement of the duodenal loop to which, at the time, and after considerable discussion, we attached little significance. Throughout the years of 1951 and 1952, this elderly patient felt fine. In October of 1953, however, she developed a mild degree of jaundice which quickly became more severe, led to her hospitalization and exploration by surgery. She was found to have an inoperable carcinoma of the head of the pancreas which progressed rapidly and led to her death. She had been made comfortable of her pruritus from jaundice, however, by a cholecystojejunostomy-Roux-Y procedure. In retrospect, we are certain that this patient had already had carcinoma of the pancreas in November 1950. Perhaps some of you will question this long latency but I think it is safe to say that many patients will harbor a carcinoma of the pancreas for one to two years before serious symptoms develop and that during this time, many of them may be thought to have a functional disturbance.

The point I am trying to make is that if one considers the question of early diagnosis in carcinoma of the pancreas he must keep constantly in mind the possibility of its existence because most of the clinical pictures upon which we base the diagnosis are already indicative of advanced disease.

I am one of those who think it is important to differentiate between carcinoma of the head of the pancreas as distinguished from carcinoma of the body and tail of the pancreas. There is reason to believe that carcinoma of the body and tail of the pancreas metastasizes early whereas carcinoma of the head of the pancreas does not. Also carcinoma of the tail of the pancreas will not make itself apparent until regional extension and perhaps liver metastases have appeared. In carcinoma of the body of the pancreas, pain may

be present early, especially if the celiac plexus is involved. In carcinoma of the head of the pancreas, jaundice is a distinguishing factor. In summation one would say that jaundice, pain and loss of weight are a trio of symptoms and signs which should make one think of pancreatic growths.

Whereas years ago it was the opinion of most of us that carcinoma of the head of the pancreas was characterized by a painless progressive jaundice, it is generally recognized now that in only about 20 per cent of the cases is this really the situation and that in about 80 per cent of the cases, pain is present. If one looks for blood in the stool and anemia, one will not make an early diagnosis of carcinoma of the pancreas for especially in carcinoma of the body and tail, anemia is absent as is also occult blood in the stool except in rare instances. Only when and if there is invasion of the duodenum or the stomach do these appear or when carcinoma of the head of the pancreas is actually carcinoma of the ampulla or biliary ductal system. Another differentiating finding of carcinoma of the body and tail is the appearance of thromboembolic phenomena. The exact mechanism of these vascular thromboses is not well understood except that it is believed that some clot-promoting substance may appear as a by-product of the carcinomatous condition which, with other factors, results in intravascular platelet coagulation. In contradistinction to this, carcinoma of the head of the pancreas is associated with hypoprothrombinemia and thrombocytopenia. In fact, these patients need Vitamin K.

You will find long statements which relate to a differential diagnosis between carcinoma of the head of the pancreas and chronic relapsing pancreatitis. These statements include many laboratory studies. I think it would be much more helpful to all of us if we will use our clinical acumen to make such a differential diagnosis and I think sometimes that patients are too ill to be troubled with elaborate tests. For example, if a patient has persistent jaundice and an enlarged gallbladder and persistent pain, he probably has carcinoma of the pancreas whereas if he has intermittent attacks of pain without an enlarged gallbladder and with intermittent or no jaundice, he more likely has chronic relapsing pancreatitis. It would, however, be desirable as with liver function tests, if we could evaluate the status of the pancreas.

In reviewing the literature, one finds that by using the serum amylase, serum lipase and alkaline phosphatase tests, he can often obtain a good evaluation of the extent of the carcinoma. For example, if the serum amylase and serum lipase are elevated and the alkaline phosphatase is normal, one may conclude that the pancreas alone is involved probably in an inflammatory process whereas, if all three are elevated or only the serum lipase and alkaline phosphatase, one would conclude that a pancreatic neoplasm is present with liver metastases. If, on the other hand, only the alkaline phosphatase is elevated the probability is that the liver alone is involved but it is still possible that the pancreas is also involved. An elevated serum amylase is more important

in inflammatory lesions whereas intermittent elevation of serum lipase may be more likely to indicate an obstructive lesion. I do not wish to say that the diagnosis can be made so simply but the tests *if properly coordinated with the clinical findings* will be of great help in arriving at not only the diagnosis but the extent of involvement.

The challenge to the medical profession is obvious. We must make earlier diagnoses. One could more readily justify an early exploration on the suspicion of pancreatic carcinoma then he could justify its omission. Especially in carcinoma of the tail and body would early diagnosis allow for the possibility of curative surgery. When the patient is explored I think it is important to do a pancreatic biopsy. Many surgeons prefer not to do such biopsies for fear of producing pancreatic fistulae or other undesirable complications such as hemorrhage. At laparotomy, however, the Vim-Silverman needle can be used not only to obtain sufficient material for biopsy but it can make it possible to examine tissues deep in the gland.

It is not my purpose in this abstract article to discuss the various operations which one can and should do in carcinoma of the pancreas. I hope to elaborate on those procedures at another time but you will recall that on the occasion of my talk before your Association, I made it clear that although the mortality is high the inevitable results of nonoperative procedures are so serious and relentless that only by operation can we make these patients more comfortable or can we develop improved operative technics and thereby hope to arrive at cures.

CURRENT TRENDS IN THE MANAGEMENT OF PANCREATITIS*

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Pancreatitis must now be recognized and accepted as a common cause of both acute and chronic abdominal pain. The relative inaccessibility of the pancreas to both physical examination and roentgenologic investigation poses a difficult diagnostic problem when the symptomatology is often so variable and bizarre. Furthermore, there is no available laboratory test which is reliable in all stages of the disease. Therefore, it must be assumed that the diagnosis is frequently missed. This may result in untimely surgical intervention in the acute case or ill-advised operations in chronic pancreatitis.

Earlier diagnosis and meticulous treatment based on sound physiologic principles will reduce the relatively high mortality rate in all types of pancreatitis. Recent innovations that have facilitated the accomplishment of these concepts in 143 cases of pancreatitis seen in this clinic since January, 1947 are presented (Table I).

The exact etiology of pancreatitis remains controversial. Perusal of the many advocated concepts of its pathogenesis discloses, however, two common denominators which must occur simultaneously. These are an actively secreting pancreas and obstruction to the outflow of pancreatic juice, either within the pancreatic ductal system or the ampulla[1]. In addition, the high incidence of concomitant biliary disease may be a factor.

Diagnosis

The symptoms of pancreatitis may vary in severity from "indigestion" to a devastating intraabdominal catastrophe. The accompanying signs are equally variable and may lead to the extremes of considering the patient a psychoneurotic or an acute surgical emergency. The chronic case often receives prolonged treatment for peptic ulcer or gallbladder disease until pancreatic calcification is seen during x-ray investigation of chronic abdominal pain.

Pain is the only constant symptom of both acute and chronic pancreatitis. The retroperitoneal location of the pancreas accounts for the variability in severity and localization of the pain. The localization and referral of pan-

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creatic pain was previously investigated in this clinic by means of electrodes placed in the head, body and tail of the pancreas at the time of elective biliary surgery[2]. Subsequent stimulation of the three segments of the pancreas through these electrodes demonstrated that pain originating in: (a) the head localized in the right epigastrium; (b) the body localized in the midepigastrium; (c) the tail was more diffuse and might be located anywhere from the left epigastrium to the left lower quadrant. Only on intense stimulation of a single segment or stimulation of all three areas simultaneously, was classical upper abdominal band-like pain or referral to the back produced. Therefore, the presence of band-like pain or referral to the back implies severe or diffuse involvement of the pancreas. Measurable changes in the pain threshold of these patients following splanchnic blocks re-affirmed previous concepts of sympathetic mediation of pancreatic sensation. These studies emphasize that pancreatitis may be implicated in any patient with upper abdominal pain.

A serum amylase determination should be obtained promptly in every patient with acute abdominal symptoms[3]. This test remains the single most

TABLE I

DISTRIBUTION AND MORTALITY RATES OF ALL TYPES OF PANCREATITIS
1947-1954

Type	No.	Deaths	Mort.
1. Acute (primary)	80	3	3.7%
2. Postoperative	22	11	50.0%
3. Traumatic	6	1	16.6%
4. Chronic*	35	3	8.5%
Totals	143	18	12.5%

*Three attacks, calcification or biopsy confirmation.

reliable diagnostic criterion in acute pancreatitis[4,5]. Elevations of serum amylase values, however, usually return to normal or equivocal levels before acute signs and symptoms subside. This occurred in 40 per cent of cases within 48 hours and in 60 per cent within 72 hours. Serum lipase values remain elevated longer but this test requires more time, is less accurate and frequently is not available. In contrast to the rapid fall in elevated serum amylase values, studies in this department have shown that the amylase content of peritoneal fluid is much higher and remains elevated up to four days longer[6]. This fluid may be safely obtained by a simple paracentesis with a small caliber needle. As little as 0.2 c.c. may be diluted to the necessary volume and used for accurate amylase determination. This procedure is particularly valuable in the patient suspected of having pancreatitis with symptoms of two or more days' duration and a normal or equivocal serum amylase. An elevated peritoneal amylase may thus establish the diagnosis in a baffling case and avoid the added morbidity and mortality of unwarranted surgical intervention. The diagnosis has been established by peritoneal fluid amylase determinations in 20 cases of acute pancreatitis whose serum amylase values on admission were less than

300 units[7]. Serum amylase determinations are of little or no value in chronic cases except during acute exacerbations.

Transient glycosuria has been observed in 35 per cent of the acute cases. Slight jaundice is also observed frequently.

Radiographic findings, although not specifically pathognomonic of acute pancreatitis, often afford valuable corroborative evidence. Localized small bowel distention in the mid-abdomen or left upper quadrant, displacement of the stomach upward or forward, left pleural fluid with basilar atelectasis and enlargement of the duodenal "C" loop on barium study are all suggestive findings in the acute case[8]. Calcification in the pancreas or pancreatic enlargement

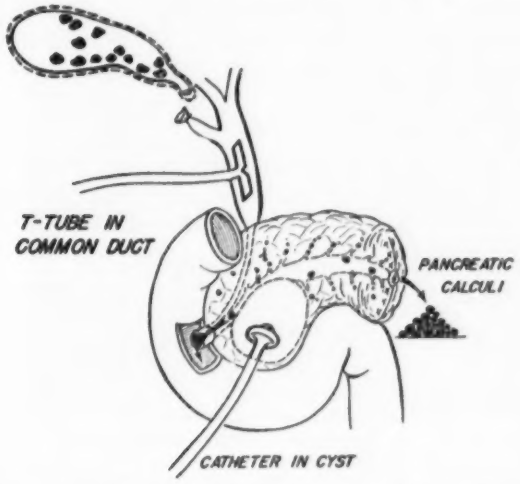

Fig. 1a–Cholecystectomy, exploration and drainage of common duct, sphincterotomy, catheter drainage of pseudocyst in head of pancreas, and resection of tail of pancreas with removal of calculi from main pancreatic duct. (*Courtesy, New England J. Med.*)

manifested by a retrogastric mass or a wide duodenal "C" loop are probably the most accurate indications of chronic pancreatitis and/or a pseudocyst.

Physical findings are so variable in both acute and chronic pancreatitis that the diagnosis is ultimately dependent upon laboratory or radiographic confirmation. The appearance or the presence, however, of a tender epigastric mass following acute abdominal pain or trauma is suggestive of a pancreatic pseudocyst.

The clinician should always consider the possibility of pancreatitis in all cases of either acute or chronic abdominal pain. A high index of suspicion, utilization of serum amylase determinations on an emergency basis and search-

ing for suggestive x-ray findings will disclose pancreatitis with surprising frequency. Eighty cases of acute pancreatitis were seen, compared with 73 patients with perforated ulcer, during the same interval. One should remember that cases of recurrent or chronic pancreatitis are often misdiagnosed and treated for peptic ulcer or biliary disease. It is not unusual for these patients to respond temporarily to such treatment, but eventually they develop upper abdominal pain which is no longer relieved but is aggravated by eating. Furthermore, 16 per cent of acute cases and 40 per cent of those with chronic pancreatitis in this series had definite alcoholic backgrounds.

Management

Despite the multitude of therapeutic measures which have been advocated in the treatment of acute pancreatitis, three fundamental objectives are of paramount importance (Table II). These objectives are: (a) to place the

TABLE II

Summary of Management of Acute Pancreatitis

1. Relief of pain
   A. Demerol—not morphine
   B. Splanchnic blocks
2. Reduce Pancreatic Secretion
   A. Gastric Suction
   B. No Oral Intake
   C. Vagal Blocking Drugs
3. Replenish Depleted Blood Volume
   A. Whole Blood
   B. Serum Albumin
4. Correct Chemical Derangement
   A. Appropriate Fluids & Electrolytes
   B. Hyperglycemia—Insulin
   C. Hypocalcemia—Calcium Gluconate
5. *Avoid Surgery*

pancreas at physiologic rest; (b) to correct the concomitant depletions in blood volume, fluid and electrolytes; and (c) to correct any existent, concurrent biliary disease after subsidence of the acute process. Theoretically, promotion of drainage of pancreatic juice should be added, but this is impractical. These objectives are best achieved by prolonged gastric suction, withholding all oral intake, use of vagal blocking drugs, and judicious replenishment of estimated depletions of fluid, electrolytes and the appropriate component of the blood volume.

Prolonged gastric suction serves the dual purpose of eliminating the secretin and pancreozymin phase of pancreatic secretion and minimizing the coexistent paralytic ileus. It should be continued until 48-72 hours after all symptoms have subsided and hunger returns. Fasting also serves the same purpose by

elimination of the gastric phase of gastric secretion of hydrochloric acid which in turn minimizes secretin production.

The most frequent errors committed in the management of acute pancreatitis are: (a) failure to suspect the disease; (b) neglecting to obtain an early serum amylase determination; (c) premature abandonment of gastric suction; and (d) insufficient replacement of depleted blood volume.

Depletions of both components of the blood volume in acute and chronic pancreatitis have not been widely appreciated. We are indebted to Kenwell and Wels, who have advocated administration of large amounts of human serum albumin[9]. They attributed much of the success thus achieved to antitryptic activity of serum albumin. We have not been able to confirm any antitryptic effect of serum albumin as measured by antifibrinolysin titers[10]. The

Fig. 1b—Subsequent diodrast injection through catheter into pseudocyst shows dispersion through ductal system but unsatisfactory drainage through previously sectioned sphincter. (*Courtesy, New England J. Med.*)

terminal shock of patients succumbing to the disease, however, and the high frequency with which blood volume deficits are found in pancreatitis suggest that serum albumin should be quite effective in replenishing plasma volume depletions.

Whole blood volumes obtained in 19 patients with acute pancreatitis showed deficits of less than 500 c.c. in four, deficits of between 500 and 1,000 c.c. in four, between 1,500 and 2,000 c.c. in five and over 2,000 c.c. in six. Whole blood volume studies in 11 patients with chronic pancreatitis demonstrated deficits of less than 500 c.c. in two, between 500 and 1,000 c.c. in one, between 1,000 and 1,500 c.c. in four, between 1,500 and 2,000 c.c. in two and over 2,000 c.c. in two[11].

Vomiting with resultant fluid and electrolyte depletion occurs in most cases of acute pancreatitis. Utilization of the flame spectrophotometer and care-

ful tabulation of the patient's water balance greatly facilitates the replacement of these deficits.

Cognizance and utilization of these principles in the management of 80 cases of acute pancreatitis has lowered the mortality rate to 3.7 per cent (Table I). Acute postoperative pancreatitis, however, remains a catastrophic complication with a mortality rate of 50 per cent in 22 patients in this series. This mortality could be significantly lowered if the diagnosis were established and treatment instituted earlier. A serum amylase should be obtained promptly in any patient with undue pain, distention or other intraabdominal complications following biliary or gastric surgery or splenectomy[12].

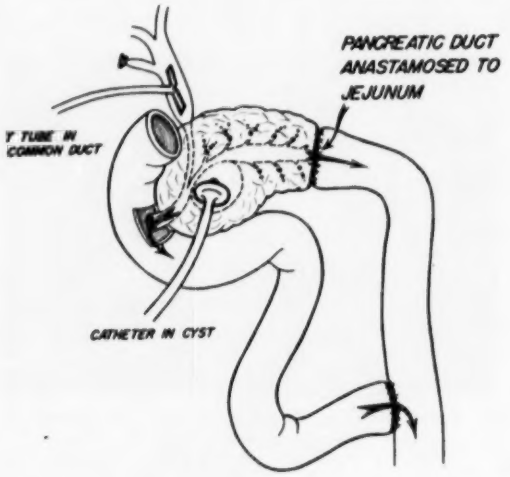

Fig. 2a—Second operative procedure. The main pancreatic duct has been reopened at the line of previous pancreatic resection, additional calculi removed and the distal end of the remaining pancreas and main pancreatic duct anastamosed to a Roux-Y loop of proximal jejunum. *(Courtesy, New England J. Med.)*

Acute traumatic pancreatitis is occurring more frequently as a result of industrial and steering-wheel abdominal injuries[13]. A relatively silent interval frequently follows the initial pain of injury, only to be succeeded by severe, constant epigastric pain accompanied by nausea and vomiting. If the diagnosis can be established and perforation of a hollow viscus or rupture of other solid organs can be reasonably excluded, conservative therapy as in acute pancreatitis will yield the lowest mortality. Subsequent appearance of a pseudocyst in these cases is relatively common and may be suspected when the serum amylase remains elevated and a tender epigastric mass appears. There was one death among seven cases seen with traumatic pancreatitis. This patient, however,

had a complete transection of the pancreas over the vertebral bodies, multiple fractures and subsequently developed thrombosis of the renal veins.

After recovering from acute pancreatitis, an investigation of the patient's biliary tract is indicated if gallstones or cholecystitis have not previously been found[14,15]. Cholecystitis or cholelithiasis was found in 50 per cent of 80 cases with acute pancreatitis and in only 17 per cent of 35 cases with chronic disease. Common duct stones were found in nine of 80 cases of acute pancreatitis and in only three of 35 patients with chronic pancreatitis. Demonstrable biliary disease in a patient who has had pancreatitis should be corrected[15]. Pancreatitis is an additional indication for common duct exploration.

Modified treatment, including smaller meals, vagal blocking drugs and abstinence from alcohol, should be continued after recovery from acute pancreatitis.

Fig. 2b—Subsequent diodrast injection into pseudocyst shows adequate retrograde drainage of ductal system into jejunum. (*Courtesy, New England J. Med.*)

There is much controversy concerning the management of chronic pancreatitis and the technical problems involved are more complicated. It is notable that the incidence of concomitant biliary disease is much smaller than in acute pancreatitis and that its correction alone produces poor results. Therefore, it is reasonable to assume that biliary disease is not so important in the pathogenesis of the chronic variety. Section of the sphincter of Oddi, advocated by Doubillet and Mulholland[16], has a sound physiologic basis and initially showed great promise, but it has not proven to be a universally satisfactory procedure. Vagotomy accompanied by gastrojejunostomy has considerable merit, but symptoms and recurrent attacks frequently continue postoperatively. The addition of a limited gastric resection[17] to remove the antrum combined with sphincterotomy and vagotomy has yielded a good percentage of long remissions. Splanchnic nerve resection has been reported as affording relief from the pain of chronic calcareous pancreatitis[18]. The greatest problem is posed by the

patient with extensive pancreatic calcification, recurrent acute exacerbations, absence of biliary disease, malnutrition and drug or alcoholic addiction. In addition, unsuspected pancreatic pseudocysts are frequently found in these cases.

Two such cases have recently been treated in this clinic. Both had initially been totally incapacitated by their disease, had lost over 30 pounds in weight and were addicted to drugs or alcohol. Each had extensive pancreatic calcification, a pseudocyst in the head of the pancreas and cholelithiasis. Following cholecystectomy, drainage of the pseudocysts, sphincterotomy and vagotomy, both patients were improved but continued to have less severe symptoms.

Subsequent diodrast injection into the pseudocysts produced good visualization of the pancreatic duct systems and demonstrated continued distention of the main pancreatic ducts which contained many calculi and drained poorly through the previously sectioned sphincters. Both patients were subjected to second operative procedures in which the tail of the pancreas and the spleen

TABLE III

SUMMARY OF OBJECTIVES TO BE ATTAINED AND SURGICAL PROCEDURES WHICH MAY BE UTILIZED IN MANAGEMENT OF CHRONIC PANCREATITIS

1. Remove Biliary Tract Disease
2. Promote Free Pancreatic Drainage
   Section of Sphincter of Oddi Pancreaticojejunostomy
3. Drainage of Cysts
4. Decrease Pancreatic Secretions
   Vagotomy + Gastric Resection or PGE
5. Resection (Partial or Total)
6. By-Pass 'Common Channel'
   Choledochojejunostomy, etc.
7. Control of Intractable Pain
   Sympathectomy

were resected. The transected, dilated main pancreatic duct was emptied of calculi and then anastomosed to the proximal jejunum in an attempt to establish retrograde pancreatic drainage. This procedure has been demonstrated to be feasible in the surgical laboratories[19]. Variations of this technic have previously been reported[20,22]. Both patients are now relatively symptom-free, have gained weight and returned to former employment (Table III).

The multitude of surgical procedures which have been used in attempting to solve the puzzling problem of chronic pancreatitis attests to the fact that no one operation has been singularly successful. Although the controversy still rages concerning the procedure best suited to relieve this disabling disease, the fundamental objectives in surgical treatment are clear (Figs. 1 and 2). These consist of correcting any concomitant biliary disease, inhibition of pancreatic secretion, establishment of free drainage of both pancreatic juice and bile and drainage or excision of pseudocysts. Since there are multiple etiologic factors

in chronic pancreatitis, any attempt to adopt a "standard" operation will often be doomed to failure. The patient with chronic pancreatitis requires meticulous preoperative preparation including restoration of blood volume, extensive investigation as to the extent of the pathology and its most likely pathogenesis and a judicious selection from a variety of available surgical procedures to achieve the stated objectives in each individual.

Treatment of 35 cases of chronic pancreatitis with these concepts has been moderately successful and has yielded a mortality of 8.5 per cent (Table I).

Summary

A high index of suspicion and emergency utilization of serum amylase determinations in all cases of acute abdominal pain will disclose acute pancreatitis with surprising frequency. This allows early treatment consisting of inhibiting pancreatic secretion and replacement of the usual blood volume deficit and avoids the added hazard of untimely surgical intervention. Acute postoperative pancreatitis occurs soon after surgical procedures on the stomach, biliary tract or spleen. It is to be suspected in cases with undue pain and distention.

The management of chronic pancreatitis calls for meticulous preoperative preparation and extensive investigation of the disease process to allow a judicious selection from a variety of surgical procedures in order to attain the fundamental objectives in the individual case.

One hundred forty-three cases of all types of pancreatitis are included in this series with a mortality rate of 12.5 per cent.

REFERENCES

1. Lium, R., Portsmouth, N. H. and Maddock, S.: Etiology of acute pancreatitis: An experimental study. Surgery **24**:593, 1948.
2. Bliss, W. R., Burch, B., Martin, M. and Zollinger, R. M.: Localization of referred pancreatic pain induced by electric stimulation. Gastroenterology **16**:317, 1950.
3. McCaughan, J. M.: The value of estimations of the amylase of the blood in the diagnosis of suspected pancreatic disease. Surg., Gynec. & Obst. **59**:598, 1934.
4. McCorkle, H. and Goldman, L.: The clinical significance of the serum amylase test in the diagnosis of acute pancreatitis. Surg., Gynec. & Obst. **74**:439, 1952.
5. Elman, R.: The variations of blood amylase during acute transient disease of the pancreas. Ann. Surg. **28**:232, 1934.
6. Keith, L. M., Zollinger, R. M. and McCleery, R. S.: Peritoneal fluid amylase determinations as an aid in the diagnosis of acute pancreatitis. Arch. Surg. **61**:930, 1950.
7. Keith, L. M.: Unpublished data.
8. Grollman, A. I., Goodman, S. and Fine, A.: Localized paralytic ileus: An early roentgen sign in acute pancreatitis. Surg., Gynec. & Obst. **91**:65, 1950.
9. Kenwell, H. N. and Wels, P. B.: Acute hemorrhagic pancreatitis: Report of eleven consecutive cases treated with human serum albumin. Surg., Gynec. & Obst. **96**:169, 1953.
10. Elliott, D.: The mechanism of benefit derived from concentrated human serum albumin in experimental acute pancreatitis. Submitted to the Forum on Fundamental Surgical Problems, American College of Surgeons, 1954.

11. Keith, L. M. and Watman, R. N.: Blood volume deficits in pancreatitis. Submitted to the Forum on Fundamental Surgical Problems. American College of Surgeons, 1954.
12. Dunphy, J. E., Brooks, J. R. and Archroyd, F.: Acute postoperative pancreatitis. New England J. Med. **248**:445, 1952.
13. Rini, J. M.: Traumatic pancreatitis. Am. Surgeon **18**:596, 1952.
14. Silvani, H. L. and McCorkle, H. J.: Temporary failure of gallbladder visualization by cholecystography in acute pancreatitis. Ann. Surg. **127**:1207, 1948.
15. Raker, J. W. and Bartlett, M. K.: Acute pancreatitis: The fate the patient surviving one or more attacks: New England J. Med. **244**:751, 1953.
16. Doubillet, H. and Mulholland, J. H.: Results of sphincterotomy in pancreatitis. J. Mt. Sinai Hosp. **17**:458, 1951.
17. Richman, A. and Colp, R.: Chronic relapsing pancreatitis; Treatment by subtotal gastrectomy and vagotomy. Ann. Surg. **131**:145, 1950.
18. Ray, B. S. and Console, A. D.: Relief of pain in chronic pancreatitis by sympathectomy. Surg., Gynec. & Obst. **89**:1, 1949.
19. Bonta, J. A.: An experimental study of retrograde pancreaticojejunostomy. Submitted to the Forum on Fundamental Surgical Problems. American College of Surgeons, 1954.
20. Link, G.: The treatment of chronic pancreatitis by pancreaostomy. A new operation. Ann. Surg. **53**:768, 1911.
21. Coffey, R. C.: Pancreatoenterostomy and pancreatectomy. Ann. Surg. **50**:1238, 1909.

Discussion

Dr. I. Snapper:—The physiology of the human pancreas is not too well understood. We know many facts about the pancreas of the rat and of the rabbit, even of the dog, but this knowledge cannot always be transferred to human pathophysiology. Unfortunately most of our knowledge about diabetes is derived from the results of pancreatectomy in dogs. These animals develop glycosuria and ketonuria, and die in coma unless they receive *large* quantities of insulin.

After the whole pancreas has been removed, the human, however, needs only 30 units of insulin to remain sugar free. Evidently in humans, pancreatectomy not only removes the source of insulin but also of its antagonist,—glucagon. This is only one example to illustrate that a good part of the physiology of the human pancreas cannot be learnt from animal experimentation.

We are now able, with a certain amount of confidence, to diagnose many diseases of the gastrointestinal tract, the gallbladder, the liver. Most of this progress which has been made in the last decades, is due to improvement of x-ray procedures. On the other hand the abdominal diseases which cannot be diagnosed by x-ray procedures even today present great difficulties to diagnosis. The diagnosis of appendicitis has remained a risky enterprise and the same uncertain signs which had to be used 40 years ago—muscular rigidity, fever, leucocytosis,—must still be relied upon. A surgeon who occasionally removes a normal appendix should not be criticized because there are no satisfactory data for the diagnosis of appendicitis.

The same holds true for pancreatitis. The diagnosis of pancreatic disease requires more mental effort, more clinical sense than for instance the diagnosis

of ulcer of the duodenum, which is usually made by gazing at the roentgen shadows. The increase of amylase in urine and in serum is an evanescent phenomenon in pancreatitis. A patient with acute pain in the abdomen may have a very high serum amylase at ten o'clock at night, but the next morning it may have come down to normal limits. Our essayist has made an important contribution by showing that in such cases the amylase content of the peritoneal fluid obtained by puncture can help us considerably.

High serum amylase is found also in mumps, and in lithiasis of the salivary ducts, because due to the obstruction the amylase of the saliva diffuses into the blood. In addition the surgeons recently have brought out the fact that apart from pancreatitis perforation of a duodenal ulcer may lead to an increase of the amylase of the blood. I suspect that this will also cause a high amylase in the peritoneal fluid. Many substances, enzymes and poisons are kept within the lumen of the intestine as long as the intestinal wall is healthy. As soon as the intestinal wall is diseased, many chemical substances and bacteria can penetrate it. And this also holds true for amylase. Therefore, a moderate increase of serum amylase and pain in the upper abdomen does not always prove the presence of a pancreatitis. These symptoms and signs may occur also in other diseases of the intestinal tract, especially in disease of the jejunum and the upper ileum. This probably also holds true when the amylase of the abdominal fluid is increased.

Sometimes the diagnosis of pancreatitis is easy. When it is certain that abdominal pains are due to gallstone attacks, radiation of the pain to the left upper quadrant practically proves involvement of the pancreas. On the other hand the diagnosis of acute pancreatitis is very unlikely if leucocytosis and shift to the left are absent. There are few diseases in medicine where leucocytosis and shift to the left are as constant and as pronounced as in acute pancreatitis.

For the diagnosis of carcinoma of the head of the pancreas the old Courvoisier's law still holds its own. In jaundice a palpable gallbladder usually indicates the presence of a carcinoma of the head of the pancreas. Courvoisier himself reported that in 18 per cent of the cases this rule proved to be erroneous. These 18 per cent of errors still occur. A gallstone may be formed in the common duct. Such a stone will not cause an inflammation of the gallbladder wall. When such a primary common duct stone travels and obstructs the papilla of Vater, then the nondiseased gallbladder may become distended by the increased pressure in the common duct. This, however, is a rarity. In general the presence of a palpable gallbladder in jaundice justifies the diagnosis of carcinoma of the head of the pancreas.

The fact that carcinoma of the head of the pancreas usually causes a *complete* obstruction of the common duct is also important. The disappearance of stercobilinogen from the stool and of urobilinogen from the urine is a point

in favor of the diagnosis of carcinoma of the head of the pancreas. Carcinoma of the body or the tail of the pancreas is much more difficult to diagnose. Often the complaints of a patient indicate that he might suffer from an abdominal cancer. In such cases most possibilities—stomach, intestine, kidneys, liver—can be more or less effectively investigated. If in this way a cancer of the other abdominal organs has been excluded, then a neoplasm of body or tail of the pancreas becomes more probable. This diagnosis by exclusion is of course not sufficient proof. Other signs are also of importance. If in a patient a not too severe diabetes develops, and after half a year or a year fatty diarrhea sets in, often a carcinoma of the pancreas is present.

If in a patient with complaints indicating the possibility of an abdominal cancer, a so-called "adynamic ileus"—ileus without signs of mechanical obstruction of the intestine—develops, then there is reason to think of carcinoma of the pancreas. In addition the migrating phlebitis of patients with pancreatic malignancy is often the first sign of this incurable condition.

Cholecystojejunostomy and cholecystogastrostomy, are operations which usually have no favorable effect upon the course of carcinoma of the pancreas. I sincerely hope that the pancreaticojejunostomy has a better future than its predecessors.

Dr. O. H. Wangensteen:—We have heard two very interesting papers on the pancreas this morning. Dr. Morrison referred to the interesting observation made by Halsted at the beginning of this century. Halsted drained the peritoneal cavity in his case of pancreatitis and the patient got well. Later Otto Hahn of the Friedrichshain Hospital in Berlin, also drained the peritoneal cavity in a patient with acute pancreatitis, and it became the popular thing to do—to drain the peritoneal cavity for acute pancreatitis.

Then, some years later, it was proposed to place a drain in instances of pancreatitis at the time of operation down to the pancreas. Finally, Haberer, about the middle of the second decade of this century, suggested that the gallbladder or the common duct should be drained; and those three items of operation became the order of the day. But, as the speakers have pointed out, during the last 20 years there has been a retreat from this point of view, and I think today very few surgeons believe there is anything very specific accomplished by operation for acute pancreatitis.

Moreover, most clinicians, today, I believe, differentiate or attempt to distinguish between hemorrhagic pancreatic necrosis and acute pancreatitis.

Zoeppfel of the Barmebeck Krankenhaus in Hamburg, in the late '20's, differentiated sharply between pancreatitis and pancreatic necrosis. In Dr. Keith's 80 cases with a 3.7 per cent mortality, there was undoubtedly a preponderance of the so-called pancreatitis with edema. Zoeppfel pointed out that the mortality of edematous pancreatitis was very low as contrasted with instances of hemor-

rhagic pancreatic necrosis. My experience, like that of most surgeons, has been that there is no therapy, conservative or operative, that does very much for patients with acute hemorrhagic pancreatic necrosis.

It would appear that these forms of pancreatitis are different diseases with likely different etiological agents. However, clear demonstration of the usual mode of origin of each of these types of pancreatitis is still demanding explanation.

Drs. Morrison and Keith reviewed very well the current ideas of causes of pancreatitis, and I speak generically now in putting these two together. I suppose in the main they may have some etiologic relationships which might be similar.

When Evarts Graham, of St. Louis, manifested a special interest in the gallbladder 30 years ago, as you recall, he spoke of hepatitis, and implied that acute biliary tract infections may have some relation to acute pancreatitis. I am not certain of any good, factual demonstration of there being any relationship between acute hemorrhagic pancreatic necrosis and acute obstruction in the gallbladder, or cholecystitis. In the classical case of Opie, a stone 3 mm. in diameter was found at the ampulla of Vater causing regurgitation of bile up the pancreatic duct which circumstance was responsible for the development of acute hemorrhagic pancreatic necrosis.

Dr. Alan P. Thal of my clinic has been able to provoke quite uniformly the occurrence of hemorrhagic pancreatic necrosis in the dog, employing the Schwartzmann phenomenon. Schwartzmann used the meningococcus in eliciting his reaction. Thal finds he can produce hemorrhagic pancreatitis employing the Schwartzmann phenomenon with the meningococcus as well as by several other organisms or bacterial toxins. The first injection is made into the pancreatic duct under very low pressure—considerably less pressure than is necessary to provoke pancreatitis by duct injection alone. Then after a period of 12 hours or more, a second intravenous injection is made with the same agent. A lethal hemorrhagic pancreatitis ensues almost invariably.

It would be more intelligible to us, of course, if Thal could do this with a second injection in the duct, but, mind you, the second injection has to be made intravenously, a circumstance which suggests that this is a systemic response. Thal has been interested in attacking these experimentally produced lesions in a therapeutic way. It is interesting that the only way in which he has yet influenced the outcome at all favorably with a mortality of less than 100 per cent, is by use of cross-circulation transfusion. The donor dog apparently can clear the blood stream of the injected animal with a definite salvage of life which Thal has been unable to achieve by any other means. Does this mean that we may come to employment of cross-circulation or some variant thereof for peritonitis or other acute bacterial diseases? The healthy organs

of the donor dog obviously can perform important physiologic processes, which the organs of the sick dog can no longer do.

I am sure there is not a surgeon here who has not toyed with the idea of how to improve the miserable record of pancreatic necrosis. I have experimented in the laboratory over a period of years with many things, including excision of the pancreas, and by destroying it *in situ* by use of the cautery. These efforts have been failures, and I have not had the courage to try to remove the pancreas in a patient with acute hemorrhagic pancreatic necrosis. All this suggests that what we really need is a good antitrypsin or specific immunoprotective agents.

I was very much taken by the suggestion of Dr. Keith to anastomose the distal end of the pancreas to the upper jejunum, a suggestion which I think the late R. C. Coffey, of Portland, made about 40 years ago for an obstructed duct. I confess I have toyed with this idea and can recall now two or three instances of relapsing pancreatitis, in which I wish I had done this. There undoubtedly will be instances in which this proposal will resolve the situation in which sphincterotomy of the ampulla has failed.

As Dr. Keith implied, in his second group of cases, the large mortality of postoperative pancreatitis suggests that injury of the head of the pancreas at operation is a serious occurrence. Yet, we do not know why it is so serious. In some patients, a pancreatic fistula may develop; in others, pancreatic necrosis. I find in doing segmental gastric resection for difficult duodenal ulcers that the hazard of pancreatic injury is done away with. Concomitant performance of a Heineke-Mikulicz pylorotomy does not injure the pancreas. Postoperative pancreatitis following gastric resection has not been observed in my clinic since we abandoned the Billroth II as the standard procedure for duodenal ulcer.

I want to say one other thing. Cancer of the body of the pancreas has, I believe, a fairly characteristic clinical syndrome. I have talked about it in one of these sessions previously and will say nothing more other than to say this again: When you have a patient who, you think, has an obstruction of the colon, who complains of intestinal colic and abdominal pain, in whom roentgen studies of the colon are negative—that patient probably has a cancer of the body of the pancreas. I have seen this chain of circumstances many times.

I wish I could be enthusiastic over operations for cancer of the pancreas, especially of the head of the pancreas. However, I must confess to sharing the lack of enthusiasm for surgery in pancreatic cancer that Dr. Snapper expressed yesterday for gastric cancer. However, that does not mean we should not do those procedures. Moreover, in our clinic there has been fortunately a successive group of surgeons who have addressed themselves to the difficult problem of cancer of the head of the pancreas with real enthusiasm. John Paine, now of Buffalo, Clarence Dennis of Brooklyn, Richard L. Varco, George Moore of

Buffalo, and now Bernard Zimmermann—these surgeons have managed to maintain a lively interest in the problem. The results are not as good as in cancer of the stomach, but the record is continuously improving.

Question:—"How is postoperative pancreatitis diagnosed?"

Dr. Luther M. Keith, Jr.:—I assume this question is probably from Dr. Wangensteen.

Dr. Wangensteen:—No.

Dr. Keith:—I recall that he has reported drainage of fluid containing large amounts of pancreatic enzymes from wounds following splenectomy.

In answer to the question regarding the diagnosis of postoperative pancreatitis, we depend upon two things: First, we suspect it following biliary and gastric surgery if the patient is having undue pain or abdominal distention, and, secondly, a markedly elevated serum amylase is found in 80 per cent of the cases within the first 24 hours following surgery. In the additional 20 per cent, the elevation occurs in from two to five days after operation.

We have been fortunate in substantiating the diagnosis by obtaining autopsies on virtually all patients succumbing to pancreatitis. In addition to elevated serum amylase values, the suspected diagnosis has often been confirmed by a peritoneal tap and an amylase determination on the aspirate.

One more word concerning the peritoneal fluid: One discussant commented on other causes of elevation of its amylase content. Control studies were performed on the abdominal fluid from about 40 other patients with a variety of intraabdominal diseases and ascites. With very few exceptions, the amylase values of this fluid were well within and usually below normal serum levels. Only three exceptions were found. I believe Dr. Bargen will recall an ingenious experiment of Dr. Pemberton's in which removable plugs were placed in duodenal openings. Later, on removing the plugs without reopening the animals, he found amylase elevations in both the serum and peritoneal fluid. Similarly, we have found slight elevations in the peritoneal fluid of patients with recently perforated peptic ulcers; however, this fluid is frequently positive for bile and contains titratable total acid. Two other circumstances in which peritoneal fluid amylase elevations have been found are strangulated intestinal obstruction and mesenteric thrombosis, presumably due to direct diffusion of lumenal contents into the peritoneal cavity.

POSTHEPATITIC CIRRHOSIS*

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In 1944 Lucké after exhaustive studies on the morphology of epidemic hepatitis concluded that in the nonfatal cases recovery was complete and that cirrhosis was not a sequelae of the disease. He further stated that even if cirrhosis was later found, that no causal relationship was established since portal cirrhosis was a common disease and the chances were that the hepatitis had been superimposed on a preexisting cirrhosis. Only a few years later there was widespread agreement that cirrhosis may definitely develop as a consequence of homologous serum or epidemic hepatitis[2,3,4]. Despite this general agreement, however, many unanswered questions remain. What is the incidence of this complication? What forms may this cirrhosis take—portal, coarsely nodular or cholangiolitic? What is the relationship to other forms of cirrhosis such as toxic nodular cirrhosis? What are the factors that predispose to its development? What is the pathogenesis and course? Is it the result of one acute infection or does the infection quietly smoulder for a long period of time?

In order to further evaluate some of these problems a study of eight necropsied cases of cirrhosis that were believed to be secondary to acute hepatitis was undertaken. In Table I some of the essential features of these cases are noted. The age varied considerably in both the initial episode of hepatitis (7-72) and in the clinical recognition of the onset of cirrhosis (15-74). There were 4 males and 4 females. The interval from the original attack to the clinical onset of cirrhosis ranged from several months to 15 years. The nature of the original episode of hepatitis differed in the individual cases. In some it was very mild while in others there were free intervals with intervening acute episodes. Both the homologous serum and epidemic types of hepatitis were represented. Three different types of cirrhosis had developed. In six it was coarsely nodular. In one it resembled a portal type of cirrhosis and in the other it was cholangiolitic (biliary). The cause of death was in some instances secondary to hepatocellular damage and in others from bleeding esophageal varices.

In Table II it may be noted that the liver size was characteristic for the type of cirrhosis that developed, so that in the coarsely nodular form it was reduced in size, whereas in the cholangiolitic case it was smooth to finely granular with an increase in size and weight. The one which resembled portal cirrhosis weighed 1,600 gm. Jaundice was present at least as a terminal event in all of the cases. Splenic enlargement in the form of congestive splenomegaly

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TABLE I

Case	Age	Sex	Initial episode of hepatitis	Interval between 1st episode and clinical onset of cirrhosis	Clinical duration of final episode	Immediate cause of death	Type of cirrhosis
1	26	F	"Viral" hepatitis for several weeks	14 months jaundice never completely cleared	—	Cholemia	Nodular
2	24	F	"Hepatitis" for several weeks	12 months	5 months	Gastrointestinal hemorrhage	Nodular
3	74	M	Posttransfusion hepatitis	18 months	3 months	Cholemia	Portal and focal Nodular
4	49	F	Hepatitis following exposure to several cases	Continuous process for 5 years	—	Cholemia and infection	Pericholangiolitis
5	33	F	Hepatitis at age of 7—Postpneumonia jaundice at 24	15 years	13 months	Postoperative for caval shunt	Nodular
6	15	M	Acute hepatitis at age of 6—1 week duration	9 years	3 weeks	Phlegmonous colitis	Nodular
7	27	M	Exposed to hepatitis in Italy while in army	Continuous process for 3½ years	—	Cholemia	Nodular
8	47	M	Posttransfusion hepatitis	4 months	2 months	Cholemia and hemorrhage	Nodular

was consistently observed. With one exception ascites was present in every case. This was also true of portal hypertension as manifested by esophageal varices.

More detailed analysis of three of the cases illustrates some of the problems involved.

Case 1:—This was a 26-year old white female who became acutely ill with anorexia, malaise and jaundice. The diagnosis of acute hepatitis was established. She was treated primarily by bed rest which was not properly observed because of the necessity for caring for her small children. The jaundice and malaise subsided after several weeks and she felt well again. Four months later, however, she became jaundiced again and was hospitalized. She felt well enough to return home after several weeks but the jaundice never subsided. Two months later an exploratory laparotomy was performed at which time a large spleen and a shrunken and nodular liver was observed. She finally died in cholemia 14 months after the initial onset.

The anatomic alterations of the liver were consistent with a postnecrotic type of cirrhosis. Coarse nodules irregularly distributed and varying up to 2 cm. in diameter were present. Between the nodules of regenerating parenchyma there were areas in which the lobules were almost totally destroyed and replaced by broad bands of collapsed stroma or scar tissue.

In a case such as this the question always remains whether the increasing hepatic insufficiency was due to a simmering, but unrelenting persistence of the infection; or whether it was the result of a severe form of hepatitis which, on healing, left the liver permanently impaired. In the latter case the increasing hepatic insufficiency could be accounted for on the basis of decreasing vascularity of the already damaged liver due to contraction of the scar tissue. The latter view is further supported by the fact that none of the liver section showed any evidence of active hepatitis.

Case 3:—This was a 74-year old male who developed hepatitis 120 days following a transfusion that was administered during the course of a mandible resection for squamous cell carcinoma. Eighteen months later he again developed jaundice, nausea, anorexia and a low grade fever. The condition progressed and he died 3 months later in cholemia.

The chief autopsy findings involved the liver and spleen. The liver was slightly increased in size and finely granular. Microscopic examination revealed a diffuse process characterized by an increase in periportal connective tissue and biliary ductal proliferation. In addition there were focal areas in which only the reticular framework of the liver lobules remained. These changes are commonly seen in cirrhosis that follows infectious hepatitis and resemble the lesions described by Thaler[5]. The problem of course in this type of case was whether or not the hepatitis caused the cirrhosis or was superimposed on an already existing portal cirrhosis. Further reference to this will be made in the discussion.

Case 4:—This was a 49-year old female who developed a "viral" hepatitis after exposure to several cases of epidemic hepatitis. The jaundice never subsided and continued for the next 5½ years until death from acute lobular pneumonia. Prior to this ascites and spider telangiectasia had developed over the chest and arms.

At autopsy the essential lesion was a far advanced cirrhosis. It is reasonably certain that this case is not one of classical obstructive or infective biliary cirrhosis since there was no evidence of involvement either with obstruction or infection of the extrahepatic or larger intrahepatic ducts. The gallbladder was normal. Many of the features suggested that the scarring represented the end

TABLE II

Case No.	Type of cirrhosis	Liver size (gm.)	Spleen size (gm.)	Esophageal varices	Ascites	Jaundice
1	Coarsely nodular	1,150	625	0	+	+
2	Coarsely nodular	1,100	350	+	+	+
3	Portal and focal nodular	1,600	550	+	0	+
4	Pericholangiolitic cirrhosis	2,115	400	+	+	+
5	Coarsely nodular	1,050	500	+	+	+
6	Coarsely nodular	1,050	740	+	+	+
7	Coarsely nodular	1,100	400	+	+	+
8	Coarsely nodular	1,950	500	+	+	+

stage of the cholangiolitic form of hepatitis. In the first place the original illness was compatible with hepatitis and secondly a biopsy taken at another hospital 6 months after the onset of her illness showed a very early periportal fibrosis accompanied by a pericholangiolitis. Several multinucleate giant liver cells were present in the parenchyma indicating some liver cell regeneration that was most likely due to previous hepatocellular damage. The difficulty here is that the anatomic picture is not too much unlike the pericholangiolitic cirrhosis described by MacMahon[6] as xanthomatous biliary cirrhosis or the primary biliary cirrhosis recently reported by Rickets and Wissler[7].

Comment

Kunkel[2] in an analysis of cirrhosis of the liver secondary to "viral" hepatitis postulated that when the hepatitis occurred at a somewhat older age than the average age of occurrence there might be a greater tendency for the development of cirrhosis. The mean age of the posthepatitic cirrhosis cases described by Baggenstoss was 36. In the small group of cases presented in this report four, however, were under the age of 25 at the time of the initial attack. Kunkel also postulated that the failure of sufficient rest therapy at the time of the initial attack might also play a part. In Case 1 in this report there certainly was evidence of insufficient rest. It has been indicated, however, in some extensive long-term follow-ups of large groups of cases who had hepatitis, that over 50 per cent of these continued at varying intervals to show clinical and laboratory evidence of liver insufficiency. The persistence or recurrence of findings did not appear to be related to the degree of activity or rest during the initial attack. It must be admitted that the analogy is not completely parallel because cases in this group which are biopsied show little or no evidence of morphological change to account for the clinical or laboratory findings. This fact also makes the problem of earlier recognition of those that will develop cirrhosis more difficult. A third factor which Kunkel mentioned was the superimposition of infection. In one case in this group there was an exacerbation years later following pneumonia. The question in this instance, however, is whether the infection merely placed an extra burden on a liver which was already developing or had developed cirrhosis and thus brought the subclinical picture to the fore.

The original severity of the clinical picture does not correlate too well with the morphologic changes seen in the acute phase. Therefore one is hard put to come to any conclusion as to those factors which determine which cases will eventually end up with cirrhosis. The problem of whether the cirrhosis develops as a result of continuing liver damage from a persistent infection or whether the infection is no longer present after the initial attack cannot be completely resolved at this time. In most cases, however, there is no evidence of active hepatitis at the time of death. Furthermore it is not necessary to invoke the persistent infection to explain the eventual progression of the disease. It is indeed difficult to picture the virus smouldering in a case for 15 years or longer without some clinical manifestations of the infection being apparent. A case has even been reported after a 35-year interval from the initial attack. If there was a greater opportunity to examine the liver shortly after the initial attack in those cases that eventually die from cirrhosis the chances are the cirrhosis would be observed to be present at that time. The eventual full blown progression would then be dependent on scar tissue contraction with diminution in vascularity, with repeated liver cell necrosis and regeneration. Acute exacerbations and more rapid progression might be precipitated by unusual demands on the liver such as infections and nutritional inadequacies.

Hoffbauer and Wittenburg[8], however, failed in their attempt to produce postnecrotic cirrhosis by means of experimental dietary necrosis in rats. Popper[9], therefore believes that necrosis from one massive insult to the liver does not necessarily produce cirrhosis and that perhaps a lingering injury to the entire parenchyma is required in addition to the original massive localized insult. According to Popper and Elias collapse of areas of liver following massive necrosis involves not only the necrotic area but produces breaks due to stress in the surrounding parenchyma. In these cracks connective tissue septa develop that dissect the now collapsed tissue. This may also be a factor in allowing for progression of the disease perhaps even in the absence of a persistent infection.

One of the main difficulties is the inability of the most experienced morphologists in the field to classify some of the types of cirrhosis with certainty. As the time goes on it becomes clearer that one type may merge into another. Despite this there are certain features which may, in most instances, be of great help in classification of cirrhosis that develops. Among these problems is the relationship and differences, if any, between the so-called "toxic" nodular cirrhosis and the coarsely nodular cirrhosis secondary to hepatitis. Before it was clearly realized that cirrhosis could follow infectious hepatitis, a well established, but not too clearly understood entity of toxic nodular cirrhosis was recognized. The specific etiology in most cases was unknown. A wide variety of toxic agents have been implicated. Undoubtedly some of these cases would be, today, classified in the group of posthepatitic cirrhosis. Although the author to his satisfaction has never been able to find any morphologic criteria that would differentiate the above two forms from each other, there is no question that many of these cases of "toxic" nodular cirrhosis form a distinct entity. One has only to note the differences in sex distribution of these various forms of cirrhosis. Whereas, in the "toxic" nodular cirrhosis, cases are limited almost entirely to females[11], in the posthepatitic group there is no distinct sex predominance. In the "toxic" nodular cases there is no clear clinical story of an onset with acute hepatitis. The problem is further complicated by the fact that one massive insult to the liver may produce a coarsely nodular picture with intervening broad bands of fibrous tissue. If sufficient parenchyma is left intact at the time of this original injury the patient will survive and often show no further manifestations of disease. These cases of healed subacute yellow atrophy or Marchand's nodular cirrhosis are difficult to distinguish from coarsely nodular posthepatitic cirrhosis. In these cases, however, there is usually no portal hypertension, and there is a lack of compression of the hepatic veins and the characteristic regenerative nodules.

The case of pericholangiolitic cirrhosis resembles in many details those described by Watson[4] of the cholangiolitic type. "Viral" hepatitis is generally recognized to occur in two forms. These forms often overlap. The first is the hepatocellular type, in which the average duration of jaundice is from two to four weeks. The other form is the periacinar or cholangiolitic which is usually

more severe with the jaundice varying from 2 to 4 months in duration. This latter form is the one which may give rise to the pericholangiolitic type of cirrhosis. In the case in this series, as well as those reported by Watson, an important finding in earlier phases of the disease was the presence of multinucleated giant liver cells in the parenchyma. This, in addition to the mild periportal fibrosis, lymphocytic infiltration, bile duct proliferation, bile staining of liver cells, and bile thrombi, is indicative of previous hepatocellular damage. It is difficult to differentiate morphologically these cases from primary biliary cirrhosis, with or without xanthoma. The problem becomes more complicated when it is realized that the biliary form of cirrhosis may merge into a portal cirrhosis. Some of the cases of primary biliary cirrhosis (Hanots) may have their origin in infectious hepatitis.

The development of portal cirrhosis secondary to "viral" hepatitis is difficult to prove with any degree of certainty. It is always possible to claim that a latent or clinically nonrecognizable portal cirrhosis was previously present or developed independently from the "viral" hepatitis. Hartroft[12], as a result of experimental and human studies, claims that the development of fat cysts in the liver is the link between lipohepatitis and cirrhosis. Based on this observation, the presence of fatty cysts within trabeculae in the liver would be pathognomic for the alcoholic or nutritional type of cirrhosis. Since fat does not appear to be a factor in the development of posthepatitic cirrhosis, the absence of these fat cysts might be evidence in favor of a case being one of posthepatitic cirrhosis. Unfortunately, other workers in the field have not completely confirmed Hartroft's findings or views. At any rate, Baggenstoss and Stauffer[3] report that in seven out of 43 cases of posthepatitic cirrhosis, the gross and histologic picture is similar to that seen in nonfatty alcoholic cirrhosis. They found such manifestations as esophageal varices and ascites to be less frequent in posthepatitic cirrhosis than in alcoholic cirrhosis. This was not the situation in the few cases presented in this report. Cholemia, ascites, and esophageal varices were equally frequent.

Conclusions

1. The most frequent form of cirrhosis secondary to infectious hepatitis is the coarsely nodular type. Less frequent forms are pericholangiolitic and portal.

2. The pericholangiolitic and portal forms are difficult to distinguish respectively from primary biliary cirrhosis and nonfatty alcoholic cirrhosis. The coarsely nodular type of cirrhosis cannot be distinguished from the entity known as "toxic nodular cirrhosis" or subchronic atrophy of the liver.

3. Factors of sex, age and activity during the initial phase of the disease do not appear to be clearly related to the eventual emergence of cirrhosis.

4. The eventual development of cirrhosis does not appear to be closely related to the apparent clinical severity of the initial attack of hepatitis. Whether

or not the progressive development of liver impairment is dependent upon the persistence of the original infection cannot be answered at this time.

5. The exact incidence of this complication is still undetermined.

6. Manifestations of portal hypertension were found to be as frequent as those of hepatocellular damage.

REFERENCES

1. Lucké, Baldwin: The Structure of the Liver After Recovery from Epidermic Hepatitis. Am. J. Path. **20**:595, 1944.
2. Kunkel, H. S. and Labby, D. H.: Chronic Liver Disease Following Infectious Hepatitis: Cirrhosis of Liver. Ann. Int. Med. **32**:433, 1950.
3. Baggenstoss, A. H.: Posthepatic and Alcoholic Cirrhosis: Clinicopathologic Study of 43 cases of each. Gastroenterology **22**:157, 1952.
4. Watson, C. J. and Hoffbauer, W.: Problem of Prolonged Hepatitis with particular reference to cholangiolitic type and to development of cholangiolitic cirrhosis of liver. Ann. Int. Med. **25**:195, 1946.
5. Thaler: Ueber die formale Pathogenese der Posthepatischen Lebercirrhose. Beitrage z. Path. Anat. u. Allg. Path. **112**:173, 1952.
6. MacMahon, H. E.: Biliary Xanthomatosis. Am. J. Path., **24**:527, 1948.
7. Rickets, W. E. and Wissler, R. W.: Cholangiolitic Biliary Cirrhosis (Primary Biliary Cirrhosis). Ann. Int. Med., **36**:1241, 1952.
8. Hoffbauer, F. W. and Wittenburg, B.: Dietary Hepatic Necrosis in the Rat-Absence of Cirrhosis Following Recurrent Episodes. Ann. N. Y. Acad. Sci., **57**:843, 1954.
9. Popper, H.: Discussion of paper listed in reference 8.
10. Popper, H. and Elias, H.: Discussion of paper listed in reference 12.
11. Bjornboe, M. and Roaschou, F.: Pathology of Subchronic Atrophy of Liver: Comparison with Laennec's Cirrhosis. Arch. Int. Med. **84**:933, 1949.
12. Hartroft, U. S.: The Sequence of Pathologic Events in the Development of Experimental Fatty Liver and Cirrhosis. Ann. N. Y. Acad. Sci., **57**:633, 1954.
13. Dubin, I. N.: Discussion of paper listed in reference 12.

THE ELIMINATION OF POSTOPERATIVE MORBIDITY IN THE SURGICAL MANAGEMENT OF CHRONIC IDIOPATHIC ULCERATIVE COLITIS*

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and

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The elimination of morbidity following the surgical treatment of idiopathic chronic ulcerative colitis depends upon two factors. The first is the choice of the proper operation to be performed. The second factor is proper execution of the operation which is selected.

Types of Surgical Intervention

The three major types of surgical intervention for chronic ulcerative colitis are vagotomy, ileostomy alone, and ileostomy plus primary colectomy.

Vagotomy:—In 1947, Dennis and Eddy[1,2] undertook the study of the effect of vagotomy on the course of chronic ulcerative colitis. This procedure was utilized in 38 patients with colitis who were followed carefully, and it was found that the best response to vagotomy occurred in those cases without appreciable fibrosis of the colon, without massive hemorrhage, and without extremely extensive ulceration. Nine of 28 cases in which vagotomy was done as the primary procedure required colectomy subsequently. Seven of these operations were done because of fear of cancer and two were performed for progressive anatomic rather than symptomatic colitis. Three of 10 cases in which vagotomy was done after previous direct surgery on the bowel (ileostomy, colectomy and ileostomy, colectomy and ileoproctostomy) were either not improved (one) or died of the disease (two). All others had remissions of the disease. Associated problems such as gastric retention occurred in more than 10 per cent of the cases, and it seemed desirable to employ a parasympathetic block which might be reversible. Accordingly, Banthine has been used effectively, and only rarely is operative vagotomy employed now. It is essential to give the drug every four hours day and night in dosage sufficient slightly to impair ocular accommodation.

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Ileostomy:—Ileostomy without simultaneous colectomy has been found to have a mortality of from 10.8 per cent to 17.6 per cent in the large series[3-6]. An additional 10.8 per cent of these patients died subsequently from colitis or the complications of that disease[3]. Because of the lower risk of primary colectomy, because the retained colon continues to be the site of further morbidity, and because closure of the ileostomy almost uniformly results in an exacerbation of colitis, ileostomy without simultaneous colectomy should be abandoned in the care of colitis.

Primary colectomy:—The retained colon is the site of serious complications which indicate that the colon should not be allowed to remain after the disease has been present for five years, especially if there is significant rigidity of the wall of the colon.

After five years the incidence of development of carcinoma in the colon may be greater than the operative risk, since the risk of primary colectomy is under 5 per cent (1.8 per cent in our 55 cases[3] and 4.1 per cent in 72 cases of Ripstein, Miller and Gardner)[7]. In our series of 263 cases of colitis, the incidence of carcinoma in those who have had the disease over five years is 8.3 per cent, in those over 10 years is 12.6 per cent, and in those over 20 years is 20 per cent[3]. Lahey has stated that the incidence of malignancy approaches 30 per cent in patients who have had chronic ulcerative colitis for ten years[8] and Counsell and Dukes report an incidence of nearly 50 per cent after 10 years[9]. In addition to the increasing incidence of carcinoma attending colitis of long duration, the seriousness of this complication is emphasized by the fact that there were 88 per cent and 93 per cent mortalities in two reported series[10,11]. Shands et al found only one of 58 patients who had had carcinoma complicating colitis alive and well after five years[12]. Lahey reports two well patients of 18 who had had carcinoma in the colon removed, and both of these carcinomas had been discovered by microscopic examination of the excised colon[5]. The clinical discovery of a carcinoma complicating colitis may be extremely difficult because development of pains, obstruction, increase in frequency, and appearance of blood or mucus in stools are not recognized as symptoms of carcinoma in patients with colitis. Also, the malignancy may not be recognizable on barium enema examination of a fibrotic colon.

In addition to the risk of cancer, the presence of the colon also carries with it additional morbidity and mortality in the form of perforation, abscess and fistula, massive hemorrhage, liver abnormalities including cirrhosis, arthritis, pyoderma, and thromboembolism[3]. The postoperative losses of fluid, electrolytes, and protein are vastly reduced by removal of the colon at the initial operation[7].

The indications for colectomy for colitis are:

1. Fulminating colitis which fails to respond within days to good medical management.

2. Acute colitis which cannot be brought under control within a month.

3. Colitis which advances the degree of damage and fibrosis to a stage where malignant degeneration would be difficult to recognize.

4. Chronic colitis of more than five years' duration.

5. Colitis with complications of serious or uncontrollable nature:

a. perforation

b. carcinomatous degeneration, proved or suspected

c. cirrhosis of the liver

d. secondary arthritis

e. secondary pyoderma

Of a group of 88 patients followed for periods up to ten years after dismissal from the hospital following colectomy and ileostomy, there have been three deaths from metastatic cancer of the colon and one of lymphatic leukemia. All others are alive and all but seven are in good health. Because of the poor results following ileostomy alone and the dangers of leaving a severely diseased colon *in situ*, the operation of choice in the treatment of chronic ulcerative colitis is ileostomy and colectomy, including the rectum, in one stage.

If the condition of the patient is so poor as to preclude pancolectomy, the rectum may not be left with the hope of using it as a functioning portion of the gastrointestinal tract because the incidence of carcinoma in the rectum after ileostomy and colectomy is dangerously high. In 70 patients in whom the rectum was not removed, carcinoma developed in three, an incidence of 4.2 per cent. Two of these patients had ileoproctostomies and one an ileostomy with residual nonfunctioning rectum[3]. Carcinoma has developed in the rectum whether the fecal stream passes through it or not.

Technic of Operation

Excluding carcinoma, arthritis, cirrhosis, and other complications which antedate colectomy, the morbidity following surgical intervention for colitis usually involves the functioning of the ileostomy or sequellae of proctectomy. Cutaneous excoriation, ascending enteritis, a stenotic orifice, fistula, prolapse, retraction and herniation are nearly always outgrowths of poor surgical management. Loss of sexual power or delayed healing of the perineum usually result from unnecessarily wide excision of the rectum.

Important factors in the construction of a good ileostomy:—1. *Choice of site:*—The ileostomy is preferably placed in the belt line and close to the mid-line, but not close enough to an incision site or to the umbilicus so that proper application of a bag is impossible. The ileostomy is then well away

from bony prominences and the crease of the groin, and a well-fitting bag may be worn without the bag loosening on exercise. The ileostomy should not be made in the laparotomy incision because healing of the incision is often retarded by ileac discharge, and the scar which results is usually depressed after a few months, making application of a skin-tight bag difficult. The skin surrounding the ileostomy must be flat so that the face plate of the ileostomy bag may be cemented securely to the skin (Fig. 1).

2. *Type of incision:*—A circular incision an inch in diameter through all layers of the abdominal wall will result in an adequate passage for the ileum and militate against stricture at any point, including the skin. Obstruction of the ileum will not result, and the sequellae of obstruction (ascending enteritis, crampy abdominal pain, copious liquid discharge) will not be experienced, provided also that good bowel is utilized and properly secured to the skin.

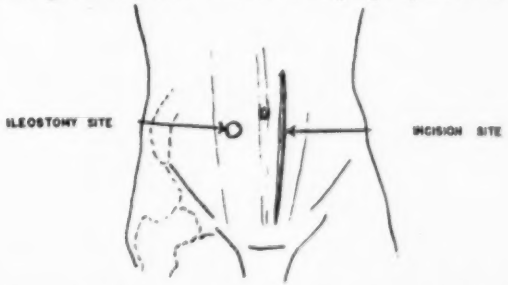

Fig. 1—Diagram showing site of left paramedian vertical incision and site of circular incision through all layers of abdominal wall for ileostomy.

3. *Use of healthy ileum:*—Approximately ⅓ of patients with chronic ulcerative colitis have involvement of the terminal ileum at the time of operation. This is most easily recognized microscopically by utilization of the rapid frozen section method. Removal of diseased ileum and use of ileum at the bottom end of normal bowel (determined by microscopic examination at operation) lead to a more secure ileostomy which will usually discharge semiformed stool within a few days, and often the first postoperative discharge is formed. Formed stool is usually not irritating to the skin, even on prolonged contact. Excoriation of the skin and fluid losses are thus prevented.

4. *Attachment to the abdominal wall:*—Secure attachment of the wall of the ileum and the mesentery of the ileum to the posterior rectus sheath and peritoneum is essential to prevention of herniation beside the ileum through the abdominal wall. Prolapse does not occur without herniation in our experience. Fine silk (0000) sutures placed so as not to include mucosa and so as not to cause strangulation of the tissue will securely attach the bowel to the abdominal wall. In our experience a fistula has never developed in the ileostomy following use of this technic (Fig. 2).

5. *Formation of mesenteric diaphragm:*—Torsion of other segments of bowel about the loop attached to the anterior abdominal wall is easily avoided by fashioning a diaphragm from the mesentery of resected ileum or ascending colon to close off the space between the terminal ileum and the anterior, lateral, and posterior abdominal walls. Without this precaution, torsion around the ileostomy loop may result in intestinal obstruction and circulatory embarrassment in the loop of intestine thus caught, or in the ileostomy, necessitating emergency laparotomy to relieve the torsion.

6. *Skin attachments:*—Attachment to the bowel of the margin of the skin incision is done in such fashion as to provide some slack ileum in the fatty layers and prevent the later funnelling of the skin down to the mucocutaneous junction after the patient gains weight. As subcutaneous fat increases, there is extra length of ileum provided to allow the stoma to move out from the fascia, retaining a flat skin surface. An ileostomy at the bottom of a funnel of skin makes it impossible to fit a bag properly and excoriation of the skin and stenosis result.

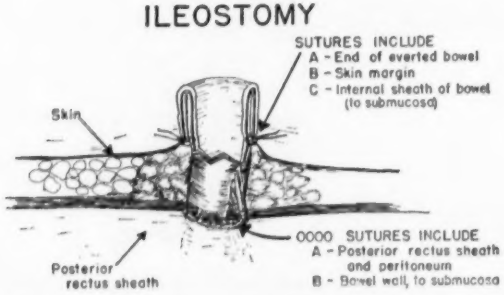
ILEOSTOMY
SUTURES INCLUDE
A - End of everted bowel
B - Skin margin
C - Internal sheath of bowel (to submucosa)
Skin
0000 SUTURES INCLUDE
A - Posterior rectus sheath and peritoneum
B - Bowel wall, to submucosa
Posterior rectus sheath

Fig. 2—Diagram showing suture of ileum to posterior rectus sheath and peritoneum, eversion of ileum, suture of end of ileum to skin and wall of ileum at skin level. Sutures in wall of ileum are of #0000 silk and do not penetrate mucosa.

7. *Coverage of the projecting stoma:*—Eversion of the end of the projecting ileum and suture of the cut edge of the ileum to the skin margin results in a well covered ileostomy which is very soft and pliable. A modification of the method of Brooke[13] allows the mucosal edge to heal onto the skin edge within a very few days and results in a minimal amount of fibrosis around the stoma, and an additional cause of stenosis is thus eliminated. A stoma results which may be fitted with a bag at once, or after 36 hours, and allowed to function spontaneously.

8. *Immediate aftercare:*—In the immediate postoperative period, the ileostomy bag is not cemented to the skin until the mucocutaneous junction has healed. During the first few days the ileostomy is surrounded with petrolatum-covered gauze and a thin layer of absorbent gauze is placed over this so that

the stoma is surrounded by this dressing. A Koenig-Rutzen bag* with hole of such size as just to accept the projecting ileum is applied over the dressing and held snugly with an elastic belt, and the skin is thus protected until healing is accomplished, usually 7 days. Mucocutaneous sutures are then removed and a well-fitting Koenig-Rutzen bag is cemented directly to the skin. It is our practice to keep a variety of bags of this type for different size ileostomies on hand for use during the first three weeks after operation. The stoma decreases in size so that a bag with a smaller hole in the face-plate is required at the end of this period. Measurement of the patient for a definitive bag size is deferred until this time.

Conservative proctectomy:—Rectal excision in colitis which is not complicated by rectal carcinoma or perineal fistulae may be accomplished by dissection immediately adjacent to the rectal wall. This limited dissection spares the pelvic parasympathetic nerves and eliminates impotency after proctectomy. It also allows primary closure of the perineum in many instances and relatively quick healing if primary closure is not possible.

Conclusions

1. The proper surgical care of idiopathic ulcerative colitis can entail a risk of less than 5 per cent, a period of hospitalization less than two weeks, and return to full activity, with excellent long-time prognosis.

2. The operation of choice for chronic idiopathic ulcerative colitis is ileostomy and total colectomy as a primary one-stage procedure.

3. If the condition of the patient precludes proctectomy at the first stage, the rectum should always be removed at a later date because of the risk of carcinoma developing in the residual bowel.

4. Proper construction of the ileostomy results in a well-functioning ileostomy which is free of complications.

5. Excision of the rectum close to the rectal wall results in a perineal wound which heals rapidly and avoids sexual impotency.

The majority of the cases upon which this experience is based were followed at the University Hospitals, Minneapolis, Minnesota. Dr. M. H. Manson, Dr. W. T. Peyton, Dr. John R. Paine, and Dr. O. H. Wangensteen have shared supervision of the care of these patients.

REFERENCES

1. Dennis, C., Eddy, F. D., Frykman, H. M., McCarty, A. M. and Westover, D.: The response to vagotomy in idiopathic ulcerative colitis and regional enteritis, Ann. Surg. **128**:479, 1948.

*Obtained from Mr. Herman W. Rutzen, 3451 Irving Park Road, Chicago, Ill.

2. Eddy, F. D.: Late results of vagotomy in the treatment of idiopathic ulcerative colitis and regional enteritis, Surgery **29**:11, 1951.
3. Dennis, C. and Karlson, K. E.: Surgical measures as supplements to the management of idiopathic ulcerative colitis; cancer, cirrhosis, and arthritis as frequent complications, Surgery **32**:892, 1952.
4. Bacon, H. E. and Trimpi, H. D.: The selection of an operative procedure for patients with medically intractable ulcerative colitis, Surg., Gynec., & Obst. **91**:409, 1950.
5. Lahey, F. H.: Indications for surgical intervention in ulcerative colitis, Ann. Surg. **133**:726, 1951.
6. Warren, R. and McKittrick, L. S.: Ileostomy for ulcerative colitis, Surg., Gynec., & Obst. **93**:555, 1951.
7. Ripstein, C. B., Miller, G. G. and Gardner, C. McG.: Results of the surgical treatment of ulcerative colitis, Ann. Surg. **135**:14, 1952.
8. Lahey, F. H.: The management of ulcerative colitis, Postgrad. Med. **8**:93, 1950.
9. Counsell, P. B. and Dukes, C. E.: The association of chronic ulcerative colitis and carcinoma of the rectum and colon, Brit. J. Surg. **39**:485, 1952.
10. Lahey, F. H.: Comment on Sauer, W. G., and Bargen, J. A., Chronic ulcerative colitis and carcinoma, J.A.M.A. **141**:982, 1949.
11. Welch, C. E. and Giddings, W. P.: Carcinoma of colon and rectum, New England J. Med. **244**:859, 1951.
12. Shands, W. C., Dockerty, M. B. and Bargen, J. A.: Adenocarcinoma of the large intestine associated with chronic ulcerative colitis, Surg., Gynec., & Obst. **94**:302, 1952.
13. Brooke, B. N.: Ulcerative colitis and its surgical treatment, London, E. & S. Livingstone, Ltd., 1954, p. 100.

Discussion

Dr. I. Snapper:—Dr. Bargen's optimism in the treatment of ulcerative colitis is very welcome indeed. Every time we despair about the non-surgical treatment of this dangerous disease, Dr. Bargen restores our courage.

We certainly all agree with Dr. Bargen that in this disease the use of corticosteroids should be limited as much as possible. There are certain patients who after treatment with corticosteroids, develop high fever, peritoneal irritation, pyodermatitis, scleritis iritis and uveitis. The use of corticosteroids in ulcerative colitis should as a general rule be limited to fresh cases. These drugs usually do not improve the chronic cases in which the dangerous complications also occur more frequently.

Every time an ileostomy must be performed on a young individual for ulcerative colitis, the physician feels defeated. Our surgical colleagues, ably assisted by the psychiatrists, try to convince us that the patient with an ileostomy can live like a completely normal person. This, of course, is not true. A patient with an ileostomy is in many respects a crippled individual. Although with good psychiatric care the patient can learn to live with his or her ileostomy there are many reasons why for a young person an ileostomy is a highly undesirable condition.

Dr. Karlson's excellent paper emphasized the development of colon cancer in ulcerative colitis. He mentioned that such patients develop carcinoma of the colon in about 10 per cent of the cases. The possibility that this relationship is somewhat different must still be considered. Needless to say that patients with

familial adenomatosis of the colon have a tendency to develop carcinoma. Patients with such adenomatosis, however, also often develop ulcerative colitis. In this way the patient with adenomatosis and secondary carcinoma development may present himself as an ulcerative colitis. As far as I've seen most of the patients with so-called carcinoma development in ulcerative colitis were actually patients with familial adenomatosis and superimposed ulcerative colitis.

As said before, I'm not enthusiastic about the inhibitions and restrictions which limit the joy of life of the patient with an ileostomy. I'm still in favor in first performing a cecostomy which in many cases of ulcerative colitis has just as favorable effect as an ileostomy. Only when the disease does not react upon cecostomy is in my opinion an ileostomy indicated.

Dr. O. H. Wangensteen:—I think we should all take a trip to China to see if we could learn as much about these conditions as Dr. Snapper seems to have learned there.

Dr. Snapper:—It would help. (*Laughter*)

Dr. Wangensteen:—I have known Dr. Jay Bargen for many years. I admire his great and continued enthusiasm for the subject of ulcerative colitis and I hope before retirement overtakes him, he will find one of those Chinese versions of simple and effective treatment, of which Dr. Snapper is so enamored. We are badly in need of such agents in the management of ulcerative colitis. Those of you who have known Jay Bargen these many years, know how successfully enthusiastic he has been with a succeeding number of agents.

Dr. Bargen did not tell us about the number of patients in his series who died. My understanding is that of patients treated conservatively for ulcerative colitis 50 per cent are dead within ten years. Surgery for ulcerative colitis in which the colon and rectum are removed—if that is necessary—is much better.

We do better than that in cancer; yes, a good deal better with some cancers. In the light of this important consideration, I think that recourse should be had to earlier surgery in many patients who, as Dr. Karlson emphasized, remained refractory after a short period of trial with conservative treatment.

Some years ago a young, adolescent boy with ulcerative colitis went from our area to a New York gastroenterologist whose name is well known in connection with this disease. The patient received psychosomatic treatment at his hands and returned home after about six months. In his hand, the patient carried a letter to his physician which stated that the patient was now 85 per cent well. That night, an ulcer in the colon perforated. His physician called me and on the basis of his statement I urged immediate hospitalization. Before the sun rose the next morning the two perforations in the colon were dealt with by colectomy. A temporary ileostomy was made and the colon was excised to the sacral promontory with the hope that continuity could be

re-established subsequently. Unfortunately, the disease in the residual rectum persisted, polyps developed and this past summer, after 3 years of waiting, I excised the residual rectum.

The sobering paper of Dr. Karlson has been very instructive. I watched with the greatest interest the development of the efforts of Drs. Dennis and Karlson at the University of Minnesota. I had a transient interest in this disease some years ago. I remember operating upon a patient by the name of Frances McAlpin, in 1940, who had a febrile course with steeple-chase fever such as Dr. Bargen illustrated in one of his case records. I did a primary colectomy for Mrs. McAlpin, anastomosing the ileum to the colon at the sacral promontory. The rectum fortunately was uninvolved. She made a nice recovery and promptly gained considerable weight and has remained well.

A short time later, I cited this latter circumstance to a well-known American proctologist. He looked at me and said: "Young man" – my hair was not white then, or he probably would not have said it – "you know nothing about ulcerative colitis." I was much chagrined, of course, to have my ignorance exposed in this unfortunate manner. However, I have a confession to make which has become a source of some comfort to me in this connection: I have yet to meet someone whose knowledge of ulcerative colitis and its nature has given its possessor great satisfaction.

Two years went by and I saw a Miss G.H., who was a spinster of 32 years. Unfortunately, the entire colon including the rectum was involved. The hemoglobin was only 60 per cent and transfusions had to be given periodically. Proctoscopically, beginning at the anal orifice and extending up as far as one could see (25 cm.), there were punctate erosive hemorrhagic areas in the bowel.

The x-ray picture was that of chronic ulcerative colitis. I proposed subtotal excision of the involved segment suggesting anastomosing the ileum to the rectum. This suggestion appalled the proctologists who insisted the disease would creep up into the ileum from the residual rectum. I felt that excision of 90 per cent of the diseased area might bring about improvement of the disease in the remaining segment. The patient assented and I went ahead. There was, of course, a persistent mild diarrhea for a short period. Gertrude was of a melancholic disposition and was slow to admit of any improvement. However, as the months went by, I noted she needed no more transfusions. All evidence of the earlier presence of ulcerative colitis has disappeared from the rectum and the patient has remained well during the intervening 13 years. It can be a serious and distressing handicap. Certainly none of us would elect to have one. The involvement of the ileum, which the proctologist predicted would most surely follow, never developed.

Eventually, I did 13 of these cases. I lost my grip on the problem when Dr. Dennis suggested vagotomy, because it sounded like such a simple expe-

dient. By the time that Dr. Dennis was convinced that vagotomy was not a therapeutic expedient of great value, he had become such an all-around expert in dealing with ulcerative colitis that I never succeeded in establishing a foothold on the problem again. I would infer from what Dr. Karlson said here today, that in some patients in whom anastomoses were made between the ileum and the rectum, that some of these subsequently had to have the anastomosis undone.

I suggest that a sober, realistic, frontal look at the problem will suggest one should employ surgery more frequently in ulcerative colitis. The mortality of the disease otherwise is too great. Too many patients die of the disease.

What Dr. Snapper said about ileostomy is, in a sense, true. Life is a serious problem. No one reaches the other shore alive. Yet, most of us want to stay afloat as long as the company is pleasant and the journey is reasonably pleasant. Nature takes away our little playthings so slowly that we scarcely recognize it. If she takes a lot of them away at once the sacrifice obviously is great and one that is not accepted readily without debate. Speaking as a surgeon, I must say, however, that it is astounding and reassuring to note how patients who have been asked, through some act of fortune to accept such a serious sacrifice, do it without too many complaints. The psychiatrist, prodding through the memories of these patients, can uncover so much unhappiness in a patient, it astounds me. I see these same patients every few months, who have had colostomies, or ileostomies. As far as I can tell, they are about as happy as mortal man can be under the circumstances. In fact, more than one man has told me when I inquired how he supported the necessity of carrying a colostomy after a radical abdominoperineal operation for rectal cancer, that it had been the means of resolving some of the disturbing tensions of life. We would do well to ponder these replies. There is much wisdom in that experience.

If a modern Diogenes were to search for an honest man with a light even more luminescent than the lamp employed by his forebearer, he would probably find ten honest men for each happy man, especially if our Diogenes was to sample a group of patients who discovered their unhappiness through psychiatric treatment.

It is a wonderful thing to be a doctor and to have the opportunity of sharing the experiences of these patients. It is indeed the greatest paymaster of the surgeon to see and talk with these patients in the outpatient clinic, and to learn that they find life pleasant, and count the sacrifices of no great moment.

I should like to believe that presently we will learn something about ulcerative colitis. I have a feeling that the approach which my colleague, Dr. Alan Thal, has been using on pancreatitis problems has some relevancy here. Of one thing I am perfectly certain: the intestinal content per se does not cause this disease. If it did, a diverting ileostomy would always cure the disease.

The story of my adolescent friend who went to New York for psychosomatic treatment gives eloquent testimony that it does not. You will recall that I found that three years of diversion of the fecal stream failed to cure the residual rectal lesions and that it became necessary to sacrifice the rectum. That, unfortunately, is a rather frequent experience. In this connection, it may not be out of place to cite the century-old clinical adage that whereas urine is poisonous to a wound, feces may exhibit a soothing balm-like effect.

Dr. Karl E. Karlson:—I should like to make one or two points. I have a couple of slides pertaining to some of the points Dr. Wangensteen raised. These slides record the experience with patients who came to the University of Minnesota for their chronic ulcerative colitis. It may be that this is a selected group, but these are patients who came to the internist as well as to the surgeon.

Of the 102 patients in the group who did not undergo surgery for their colitis during the period 1947-1951, there were 15 patients alive at the end of 1951. Thirty-seven were dead. It is to be admitted that half of them were lost to follow-up, and that makes the argument weaker; but, among those followed who were alive, only four of the 15 apparently had arrested chronic ulcerative colitis, and the other 11 were still having difficulty with their disease. Of the 37 who died, 10 deaths were unrelated to the chronic ulcerative colitis, but 27 of them apparently died of their chronic ulcerative colitis.

(Slide) Of the 159 patients operated upon, 107 were alive at the end of 1951, and of these, 97 were well or with the disease arrested. Twenty-six were dead. Among the deaths, 11 were surgical deaths and 15 were deaths due to complications of colitis. Twenty-six patients in this group were lost to follow-up, but 16 of these 26 were well, or with the disease arrested, when last seen.

So, in our experience, the patients who were operated upon for ulcerative colitis were rehabilitated in greater percentages than those who were not.

In regard to ileoproctostomy (Slide) this next slide will show you how these patients were doing after their operations: 19 patients had 5 or fewer formed stools per day; 16 had 6 or more stools, or liquid stools, per day. Of the patients who had colectomy and ileoproctostomy, 6 were catastrophes who either died of their disease or had to have further surgery. In regard to the protoscopic picture, 6 reverted to normal, 11 had increased activity, and 15 were inactive at the time of review.

How many had their ileoproctostomies taken down I cannot tell you at the present time, but this is the way these patients seem to behave after ileoproctostomy for ulcerative colitis. In some patients it has been a very good operation. The patients have been happy, perhaps happier than they would be with an ileostomy.

I, too, have seen these patients from the point of view of a surgeon, of course, and I have seen the patients who were extremely ill before their operation be very grateful, happy, and rehabilitated to normal life afterwards. We have a patient who has been a professional football player and, of course, patients who have been married and had their families after ileostomies, also.

Perhaps, Dr. Snapper, the argument that the carcinoma develops in these patients because they have had adenomatosis may well be reversed just a little bit to say that colitis is a good sign of the adenomatosis and a good indication for operation, since adenomas are precancerous lesions.

ANOMALIES OF INTESTINAL ROTATION IN GASTROINTESTINAL PRACTICE*

CLARENCE E. GARDNER, JR., M.D.†

Durham, N. C.

Anomalies of intestinal rotation are a frequent cause of trouble in new born infants. That they also are encountered frequently and occasionally cause symptoms in adult practice is not so generally recognized. The purpose of this communication is to review again the normal process of intestinal rotation and to point out the anomalies which are seen in gastrointestinal practice.

Embryology

The intestinal tract of the early embryo is a straight structure suspended in the sagittal plane on a common dorsal mesentery. The process by which this primitive position is converted to that seen at birth is called intestinal rotation.

Embryologists divide the primitive intestinal tract into foregut (mouth to duodenojejunal junction), mid-gut (duodenojejunal junction to mid-transverse colon), and hind-gut (mid-transverse colon to anus). The mid-gut loop is the one primarily concerned in intestinal obstruction and is the only one under discussion in this presentation. Frazer and Robbins divide the process of rotation of this mid-gut loop into three stages, each of which will be described along with its anomalies.

First Stage of Mid-Gut Rotation

Embryology:—The primitive intestinal tract is a straight structure suspended on a dorsal mesentery in the sagittal plane. As it elongates, the mid-gut loop bulges through the umbilical orifice into the primitive umbilical cord as a temporary physiologic umbilical herniation. The first stage of intestinal rotation is a counterclockwise rotation of 90° of this intraumbilical loop from the sagittal to the horizontal plane. It occurs at about the eighth week of intrauterine life.

Omphalocele:—Failure of rotation beyond the first stage and retention of the mid-gut loop in the umbilical stalk at the time of birth is called omphalocele, amniotic hernia, or exomphalos. In this condition herniation of intestine and sometimes also of liver and spleen into the umbilical cord is present at birth, the hernial covering being the thin translucent umbilical cord structure.

The jelly-like cord structure covering such a herniation is delicate and liable to rupture within the first few hours of life. To prevent evisceration it is necessary to close the defect as promptly as possible after delivery.

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Second Stage of Mid-Gut Rotation

Embryology:—This is the stage when reduction and major rotation of the bowel occurs and is the most important stage of intestinal rotation. The mid-gut loop returns to the peritoneal cavity from its temporary position in the umbilical herniation and at the same time rotates an additional 180° in a counterclockwise direction about the mesenteric root as a pedicle. This stage occurs quickly, at about the tenth week of intrauterine life, and in none of the models studied by Mall or by Frazier and Robbins was the gut found in its process of return. The proximal limb of the prearterial segment is thought to be reduced first, its coils entering the abdomen in an orderly sequence, passing under the superior mesenteric vessels and the mesentery. As these coils collect in the left side of the abdomen they deflect the hind-gut and its mesentery to the left so that the splenic flexure and descending colon are carried into their normal position. The cecum and adjacent colon are reduced last, and as the colon straightens out it is deflected to the right, thus completing a 180° rotation in a counterclockwise direction about the superior mesenteric artery as an axis. The duodenum thus comes to lie under the origin of the superior mesenteric artery while the colon passes in front. The final result is a 270° rotation from the sagittal position of the mid-gut loop at the start of the first stage. In this way the intestinal tract comes to occupy its position as normally seen at birth.

Anomalies of the second stage of rotation include nonrotation, volvulus of the mid-gut, malrotation, internal hernia, and reversed rotation.

Nonrotation:—In nonrotation the mid-gut loop is returned to the peritoneal cavity from the temporary umbilical herniation without having rotated beyond the horizontal plane it occupied at the end of the first stage. The duodenum descends on the right of the superior mesenteric artery. The small intestine is entirely in the right side of the abdomen and the colon is on the left. The cecum is in the left lower quadrant. The terminal ileum crosses the midline to enter the cecum from the right. From this point the ascending colon passes upward on the left of the midline to a point behind the greater curvature of the stomach. Between this point and the splenic flexure is a narrow U-shaped loop of transverse colon. The descending colon and rectum are in normal position.

You will recognize nonrotation at x-ray by noting that the duodenum descends entirely on the right side of the vertebral column and that small bowel loops are entirely on the right. The colon is entirely on the left. This anomaly may exist without symptoms.

Chronic or Recurrent Duodenal Obstruction:—If nonrotation occurs without secondary fixation of the mesentery, the entire mid-gut loop hangs free from a narrow pedicle at the origin of the superior mesenteric artery. This narrow point of suspension for the long mid-gut loop predisposes to the devel-

opment of a volvulus of the entire mid-gut. Such a condition is a frequent cause of acute duodenal obstruction in new born infants. It is also a cause of chronic or recurrent duodenal obstruction in children and young adults.

Anomalous adhesive bands crossing the duodenum in patients with non-rotation also occasionally cause chronic duodenal obstruction.

Internal Hernia:—Complicated explanations of the origin of paraduodenal, retroperitoneal or internal herniations occur in the literature which describe them as occurring in any one of as many as nine fossae about the duodeno-jejunal junction and four in the cecal area. Their explanation on the basis of an anomaly of intestinal rotation is much simpler and was first offered by Andrews in 1923. He explained the origin of the paraduodenal hernia as imprisonment of small intestine under the mesentery of the right colon during the process of fixation of the mid-gut loop after its rotation.

Haymond and Dragstedt in careful autopsy dissections of a case with large internal hernia previously observed at operation, showed that the abnormality was one of malrotation during the second stage of intestinal rotation. The essential feature of the abnormality was a rotation of the bowel into the mesentery of its postarterial segment (later to become the mesentery of the ascending colon instead of into the free peritoneal cavity, during the phase of intestinal rotation when the mid-gut loop was reduced back into the peritoneal cavity from the umbilical orifice). In their case and in ours almost the entire small intestine was in the sac. The amount of bowel involved may vary from a short loop to the entire small intestine.

Many of the patients with internal hernia have no symptoms, and the condition is recognized only incidentally at operation, anatomic dissection or autopsy. If symptoms occur they are usually those of partial or intermittent intestinal obstruction.

In our case precise diagnosis of the condition present was made by our X-ray Department who visualized the barium-filled small intestine enclosed in a circular pocket in the center of the abdomen. This pocket was surrounded by colon of the mid-gut loop. The splenic flexure and descending colon were normally placed.

At operation an adequate exposure, knowledge of embryonic origin, and delivery of as much bowel as is necessary will usually make the situation clear. Since the wall of the sac is the mesentery of the postarterial segment of the mid-gut loop (terminal ileum and right colon) care must be taken not to damage its blood vessels. The recommended procedure is to withdraw the bowel from the internal hernial sac and to close its mouth with as many sutures as are necessary.

Reversed Rotation:—In this condition a clockwise instead of a counterclockwise rotation of 180° occurs during the second stage. The transverse colon

thus comes to lie under the superior mesenteric artery and the duodenum above it. If normal fixation of the root of the mesentery toward the right iliac fossa takes place with the bowel in this position, the transverse colon becomes trapped in a tunnel beneath this acquired attachment. Fixation of the cecum and ascending colon is usually incomplete and torsion of the mobile right half of the colon with obstruction of the transverse colon at the site of the tunnel through the root of the mesentery may occur.

True reversed rotation is not common. McIntosh and Donovan collected 16 cases and added one of their own. We have never had such a case.

Third Stage of Mid-Gut Rotation

Embryology:—This stage is characterized by descent of the cecum from its subhepatic position to the right lower quadrant and fixation of the mesentery of cecum and ascending colon in the right flank. Fixation of the descending colon and of the lower portion of the duodenum also occurs in this stage which is completed about the time of birth.

The important feature of this stage is the fixation of the ascending colon and cecum with its mesentery in the right iliac fossa and with it the fixation of the root of the small bowel mesentery on a wide base from left upper to right lower quadrants. The mid-gut loop originally dependent from a narrow pedicle at the origin of superior mesenteric artery now acquires a broad oblique attachment to the posterior abdominal wall. It is the absence of this attachment which predisposes to volvulus of the entire mesentery.

Anomalies of the third stage include subhepatic cecum, retrocecal appendix and mobile cecum.

Subhepatic Cecum:—If the cecum fails to elongate and descend into the right iliac fossa it remains in a subhepatic position. If with the cecum in this position there is also failure of fixation of the small bowel mesentery on a broad attachment to the posterior abdominal wall, volvulus of all of the small intestine may occur. The only other significance of this anomaly is that appendicitis, if it occurs in such a position, may be unrecognized if the possibility of a high lying cecum is not kept in mind.

Retrocecal Appendix:—If the appendix is drawn under the cecum as the cecum descends into the right lower quadrant it may become fixed in a retrocecal position during the normal process of fixation of the cecum and ascending colon to the peritoneum of the right flank. This is a rather common anomaly and is well recognized by surgeons, although they usually fail to consider it an anomaly of rotation.

Mobile Cecum:—Failure of fusion of the cecum and ascending colon and its mesentery to the peritoneum of the right iliac fossa in a normal manner

allows undue mobility of the cecum and ascending colon. This was formerly in itself thought to be the cause of symptoms, and numerous operations were devised for its correction. At present a mobile cecum is thought to be of significance only because it may be the seat of volvulus of the cecum or because it may allow the appendix to occupy a position almost any place in the abdomen so that appendicitis in an anomalously located appendix may go unrecognized.

Volvulus of the cecum occurs only in a mobile cecum. The twist is usually a longitudinal one about the long axis of the ascending colon, although there may also be a rotation in the oblique axis so that the cecum comes to lie in the epigastrium or left upper quadrant. The signs and symptoms are those of acute intestinal obstruction, often with enormous dilatation of the cecum. Roentgenograms show evidence of dilated small bowel plus a large cecal gas shadow. Barium introduced by enema will show an obstruction in the region of the hepatic flexure. At operation detorsion is done. Cecopexy or cecostomy may be necessary. If the bowel is gangrenous it must be resected.

Summary

A precise knowledge of the mechanism of intestinal rotation is as important to the gastroenterologist as it is to the pediatrician, roentgenologist or surgeon, because anomalies in intestinal rotation often do not manifest themselves until adult life and are first seen by the gastroenterologist. The purpose of this presentation is to review the normal process of intestinal rotation and to present abnormalities which occur in adults. These include chronic duodenal obstruction, left-sided colon, internal hernia, reversed rotation with chronic colonic obstruction, the subhepatic cecum, the retrocecal appendix and the mobile cecum with volvulus.

Discussion

Dr. O. H. Wangensteen:—You are all delighted, I am certain, that Dr. Gardner, after a strenuous siege with a kidney stone, made this effort to come here. And those of you, who affect an interest in teaching, I know, would be deeply grateful if such a collection of fine slides were to come into your possession. It must have taken Dr. Gardner years of effort to complete such a collection, let alone the accumulation of the vast knowledge of such an intricate subject of which Dr. Gardner's presentation gave adequate testimony. I wish time afforded Dr. Gardner the opportunity to discuss some of the more intimate surgical implications of some of these anomalies.

We know that the mortality of volvulus of the small intestine has been very large, whether it concerns the infant or the adult; one of the reasons is that usually there has been much delay. In the many series of published cases of volvulus of the small intestine, the usual mortality has approximated

50 per cent. This is a sobering and chastening bit of information to some of you.

Unwarranted delay owing to difficulty of recognition of the presence of a gangrenous gut is the usual circumstance. Technics which would permit the recognition of the presence of a strangulated bowel could be very helpful. There is room here for some intensive study with a view to developing better technics of detecting the presence of a strangulated loop within the abdomen. Would a dye opaque to x-rays injected intravenously be trapped in the strangulated segment, permitting visualization? Would a radioactive substance detectable by a Geiger Counter be of any help? Serious thought needs to be given to some of these queries. One certainly should use thin mixtures of barium, with less misgivings in patients having intestinal colic and tenderness to note whether there is any delay in transit.

Most of us have had some experience with cecal volvulus, and Dr. Gardner talked about this very briefly. This is one of the common types of volvulus in the adult. My associates and I have been fortunate in identifying quite a large number of these. I have seen it in the postoperative period following surgery. The surgeon reaches down to examine the appendix. When I find it fairly normal, I am tempted to take it out. Every once in a while one finds it necessary to cut the lateral attachment of the cecum, and thus perhaps is induced in part one of the precursor situations which ultimately gives rise to cecal volvulus.

The presence of distention four or five days after operation with concomitant borborygmi and intestinal colic in a patient whose x-ray film of the abdomen shows a large rounded globular translucent shadow in the left upper quadrant of the abdomen such as one of Dr. Gardner's films demonstrated—such a situation accompanied by abdominal tenderness and a feculent return in the indwelling gastric suction tube suggests the presence of cecal volvulus. We have made the diagnosis correctly a number of times.

Unfortunately, one usually has to do a primary resection. We have had a fairly large series of cases at our clinic with a very low mortality. The mortality is that of delay and nonrecognition.

Dr. Gardner spoke of extrinsic duodenal stenosis. William Ladd, of Boston, helped us to understand this lesion. There is a normal return of the first duodenal loop to the peritoneal cavity, but intricate adhesions develop for whatever reason in the area of the mesenteric vessels compressing the duodenum. Sometimes it is difficult to know whether one is dealing with extrinsic duodenal stenosis, intrinsic stenosis or a web or a membrane within the gut.

I hope Dr. Gardner will publish his paper so that all of us will have a chance to read it, and I want to commend him on the excellence of his presentation. I think it would be good too if he would add something concerning his surgical experiences in the management of some of these problems.

Dr. Clarence E. Gardner, Jr.:—Well, Dr. Wangensteen, in his characteristic manner, has reached into and pointed out really the salient features of these anomalies, and I am particularly pleased that he has talked of and emphasized the importance of early diagnosis of volvulus, particularly of cecal volvulus.

He has very kindly referred to my experience, and yet I know that you know that he has had wider experience with these things than I have had. My experience has come only from the fact that my office in the hospital is very close to the operating room, and our staff, whenever they are bewildered by some unusual disposition of the intestinal tract, are wont to call on me, and I have then the experience of many young men's period of training. Over a period of years we have been interested in, and have assembled quite a collection of these anomalies.

Dr. Wangensteen has asked me to speak about our surgical experience, and I would remind you that he has published a method of replacing the nonrotated mid-gut which has become involved in a volvulus. I think he was a little modest, perhaps, and did not mention that.

It has been our practice, however, when we have a volvulus of the mid-gut, to unwrap it, detort it, and then we have found that the mesentery of the entering loop and the emerging loop, that is, the mesentery of the first portion of the small intestine, and the mesentery of the distal part, which is usually the ascending colon, are fused like two pages of a book, and they must be very carefully opened up as you would open up two leaves in a book that had been stuck. We have left the intestinal tract in that position, the duodenum coming down on the right, in the lumbar gutter and the colon being left entirely on the left; and in our experience they have not recurred.

I think Dr. Wangensteen must have had some that did recur, because he has published a method of completing normal rotation and fixation. It is quite an ingenious thing.

I think that all of you have had experiences with some type of weird abnormality of rotation. I have just shown some, perhaps the most common, but any combination of weird abnormalities may occur, which I think you can understand if you have a basic understanding of how rotations occur normally. This is a difficult embryologic process to visualize.

Larry Chapin, in Los Angeles, using facilities of the local movie industry, has prepared a movie showing this very complicated process of intestinal rotation, which I believe is the finest thing that I have ever seen to enable one actually to understand it. He showed it at the last meeting of the American Surgical Association. I am sure Dr. Wangensteen has seen it.

I thank you again for the honor of appearing before you, and Dr. Wangensteen for his very flattering discussion.

President's Message

Old Presidents must retire gracefully and make room for new ones with new ideas and the will to work-over the old ones. This course avoids dictatorships and is productive of the best over-all result. Emphasis on tried and trusted policies by new officials speaks for the excellence of the old. By the same reasoning, new officers must have the courage of their convictions to try new methods and adopt or reject them according to their merit.

I am both happy and humble to have been chosen and to have served as your President during the past year. I have been very much aware of the deep sense of responsibility and the necessity for pleasing differing personalities. It has been a pleasure to work with you and to realize the intense interest each of you have in our College.

Our first effort was an attempt to coordinate and smooth our course, according to our Constitution. It soon became evident that some very minor changes were necessary. A "grandfather" clause was considered, and our dues had to be readjusted at the request of the membership. These changes will be voted upon at the meeting of the Fellows in Chicago. All in all, the Constitution and By-laws as laid down by the founders has functioned well. With some of these handicaps lifted, it will be easier to increase our membership along more natural lines. It must be remembered, however, that numerically we have more members than ever before. Our Credentials Committee has done a good job of estimating and screening, and the general calibre of our members is rising. We must be particular but sound in our judgments.

I want to thank the officers, the Committees and their chairmen for their tireless effort in behalf of the College. You can be justly proud of your accomplishment. As the year draws to an end, I can think of many things I wanted to do, but time and other factors have not permitted their pursuance.

Be assured that you will have my continued unstinted support as our College goes forward.

Lyon A. Terry, M.D.

NEWS NOTES

New Fellowship Keys

New Fellowship keys for Fellows of the American College of Gastroenterology have been authorized by the Board of Trustees. An illustration of the new key is at the left.

Those who were elected or advanced to Fellowship in the American College of Gastroenterology since the Annual Meeting of the College in October of 1954, will receive the key without additional charge at the convocation ceremony in Chicago on Sunday, 23 October 1955.

Other Fellows may order the new keys from the headquarters office, 33 West 60th Street, New York 23, N. Y., at $10.00 each including federal tax and shipping charges.

The reverse side of the key will be engraved with the name and date of election to Fellowship. Send your orders in today.

PROGRAM CHANGES

Dr. Morris Fishbein to Speak

Dr. Morris Fishbein of Chicago, Ill., formerly Editor of the *Journal of the American Medical Association,* will be the speaker at the Burton, Parsons & Company luncheon to be given at The Shoreland on Monday, 24 October 1955.

Dr. Martin E. Rehfuss of Philadelphia, who was originally listed in the program to speak at that time, has been taken ill and will be unable to be present.

The title of paper number 33 on page 16 of the program has been changed to read as follows:

2:20 P.M.

33. "The Role of the Phrenic Nerves in Gastrointestinal Function in Animal and Man".

Speakers

Dr. N. C. Jefferson, Chicago, Ill. (by invitation) and Dr. H. Necheles, Chicago, Ill.

Through a printer's error, the last lines of the titles of paper number 2 appearing on page 20 and paper number 3 appearing on page 21 of the program were transposed. The correct titles of these papers should be:

2. "The Specificity of the Protective Role of the Pyloric Antrum in Experimentally Induced Peptic Ulceration".
3. "Recent Experimental and Clinical Experiences with Antacid Therapy in Peptic Ulcer".

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INTESTINES

SOME PROBLEMS IN THE DIAGNOSIS AND MANAGEMENT OF REGIONAL ENTERITIS, ENTEROCOLITIS, AND IDIOPATHIC ULCERATIVE COLITIS: E. Clinton Texter, Jr., Mark C. Wheelock and Clifford J. Baborka. Am. Pract. & Digest. Treat. 6:216 (Feb.), 1955.

The authors give a resume of the present status of regional enteritis and ulcerative colitis. They present six cases where the protean manifestations made the differential diagnosis difficult.

Despite the fact that these diseases may be indistinguishable clinically, they present definite pathologic differences, which are discussed.

Sprue, ileocecal tuberculosis, lymphomas, carcinoma, amebiasis and irritable colon have to be considered in the differential diagnosis.

The treatment of these conditions are at the present time unsatisfactory. Radiation therapy has been disappointing. Azopyrine, corticotropin and cortisone are of some value but only to temporarily improve the acutely ill patients prior to surgery.

These patients will benefit by wise counselling and reassurance but formal psychotherapy is not advised. Since medical treatment often fails us, we have to resort to surgery. Perforation, fistula formation, severe bleeding, and obstruction are the other indications for surgical intervention.

Ileotransverse colostomy and primary resection of involved bowel is the operation of choice for regional enteritis. Ileostomy and total colectomy should be employed for patients with ulcerative colitis.

A. J. BRENNER

ULCERATIVE COLITIS: FOLLOW-UP STUDIES: Frank C. Wheelock, Jr. and Richard Warren. New England J. Med. 252:421 (17 Mar.), 1955.

This is a statistical review by the author of 713 cases at the Massachusetts General Hospital from 1915-1949. In the present study he is only concerned with a group of 483 cases from 1943. Of this group 343 or 71 per cent, were traced for 10 years until death. The remainder were lost to follow-up study.

Survival—155 (45.3 per cent) living. 188 (54.4 per cent) dead. Ulcerative colitis

caused 153 (81.2 per cent) deaths. The other 35 of unrelated causes.

Result of nonoperative treatment – 79 (19.1 per cent) died without operation. 81 (20.9 per cent) living without operation; 232 (60 per cent) were operated on.

Duration of disease before surgery or death–the majority (58 per cent) died or required surgery within 3 years of onset.

Surgical indications and mortality–prior to 1930 mortality was 50 per cent. Mortality gradually dropped to 7.7 per cent through 1949. Indications for surgery were 66.3 per cent through 1949.

Status of survivors–Those not operated on, with disease under control–79 per cent. Those operated on with disease under control–94.5 per cent.

Frequency of Carcinoma–319 cases did not have colectomy 10 years prior to disease –28 (8.8 per cent) developed carcinoma. Location was spread evenly through colon. Age range–14-64. Duration–3-45 years. Still alive–7.

Frequency of intestinal obstruction–of 39 cases with colectomies 18 developed small bowel obstruction within first year. Died, 4. No surgery for the obstruction–3. Recurrent obstruction relieved by intubation–3. Of the 26 cases admitted for obstruction, 21 treated by surgery. In 10 there was volvulus around the ileostomy and in 11 adhesions.

The author then goes into the merits and faults of his investigation. Changes in therapy during the past years influenced mortality for the lessening. Not all patients could be followed-up. All patients followed were not studied by sigmoidoscopy and barium enema.

The following conclusions were reached on basis of survey.

1) Nonoperative management for 2-3 years will also prepare patient for ileostomy. At end of this time should be able to tell if condition is reversible.

2) If condition is not reversible, as noted by proctoscopy and barium enema, even though asymptomatic, colectomy and ileostomy is the safest course.

3) Those refusing ileostomy should have sigmoidoscopy and Ba enemas two times a year as long as colon remains and regardless of symptoms.

LOUIS K. MORGANSTEIN

LIVER AND BILIARY TRACT

THERAPY IN EXPERIMENTAL HEPATIC FAILURE: P. C. Reynell. Brit. M. J. 4911:459 (19 Feb.), 1955.

Acute hepatic failure was produced in a group of rats by injection of small quantities of carbon tetrachloride into the mesenteric vein. A controlled trial of some of the measures advocated for the treatment of acute hepatic failure in man was carried out on the rats. Vitamin supplements, large doses of parenteral liver extract, subcutaneous injections of sodium glutamate, and intramuscular injections all failed to reduce the mortality, as compared to the controls, in this type of experimental hepatic failure.

ARNOLD L. BERGER

THE POSSIBLE THERAPEUTIC VALUE OF CHOLECYSTECTOMY IN ADAM-STOKES DISEASE. G. A. McLernore and S. A. Levine. Am. J. M. Sc. pp. 386-91, (April), 1955.

Six patients with Adams-Stokes syndrome and one patient with complete heart block without syncope attacks underwent cholecystectomy for gallstones. There was no operative mortality though three had attacks of asystole during anesthesia. In each case the incidence of attacks by syncope was decidedly decreased during the postoperative follow-up period. In four cases, the improvement was striking. It would appear that the removal of the diseased gallbladder may not only relieve the patient of biliary symptoms, but also improve the cardiac status in selected cases of complete heart block that have attacks of Adams-Stokes syncope.

J. R. VAN DYNE

STUDIES OF HEPATIC FUNCTION IN DIABETES MELLITUS, PORTAL CIRRHOSIS AND OTHER LIVER DISEASES: A. Bogoch, W. G. B. Casselman, A. Kaplan and H. L. Bockus. A.M.A. Arch. Int. Med. 18:354 (March), 1955.

In order to evaluate the abnormalities of the liver associated with diabetes mellitus, liver biopsies were performed in 16 diabetic patients together with liver function tests. Sixteen nondiabetic persons with various liver diseases served as controls. The laboratory determinations showed abnormalities of serum proteins demonstrated with paper electrophoresis as well as with chemical precipitation methods. In addition BSP retention was frequently present while the various flocculation and turbidity tests were rarely altered. Biopsy revealed focal degenerative lesions of the liver in a large number of diabetics which were apparently responsible for the abnormal liver function. However, these changes were nonspecific and were also observed in several of the nondiabetic persons with liver diseases. Hepatomegaly was most frequently associated with the fatty liver caused by an accumulation of neutral fats in the liver cells. Abnormalities of carbohydrate metabolism revealed themselves microscopically by a relative increase of the intranuclear glycogen in comparison with the cytoplasmic glycogen. No relationship was found to exist between the amount of histochemically demonstrable liver lipids and glycogens and the blood levels of lipids and sugar.

H. B. Eisenstadt

MECHANISM OF ANEMIA OF LIVER DISEASE: J. Jandl. J. Clin. Invest. pp. 390-404 (March), 1955.

Studies of 20 cirrhotic patients with anemia not caused by blood loss indicated that an extracorpuscular hemolytic process was present which was proportional in severity to the degree of anemia. The mechanism of this hemolysis appears to have consisted of local destruction of red cells, probably through their sequestration in the spleen. Hemoglobin production, despite persisting anemia, did not generally exceed 2 or 3 times the normal rate, suggesting a diminished sensitivity to anoxia. Improvement in hemoglobin levels, at least initially, may be largely a result of increased production rather than of a decrease in the rate of destruction. In four patients folic acid deficiency was the factor limiting hematopoises. The ingestion of alcohol may further impair the production of hemoglobin.

J. R. Van Dyne

PATHOLOGY AND LABORATORY RESEARCH

LESIONS OF THE DIGESTIVE TRACT SECONDARY TO DISTURBANCES OF THE AUTONOMIC NERVOUS SYSTEM: R. Coujard, J. Chevreau, H. Daum and M. Maillet. Arch. mal. app. dig. 43:907 (Sept.-Oct.), 1954.

Following various stresses, the authors observed many results, of which one important part concerns the digestive tract.

In this way they obtained gastric ulcers, infarcts of the gastric wall, infarcts and ulcers of the colon and also cirrhosis of the biliary ducts.

These lesions are accompanied frequently, with infarcts of the cardiac muscle, and of the adrenal glands, and very often with lesions of the kidneys.

The authors wish to establish that a localized lesion of the autonomic nervous system, peripheral or central, manifests itself at a distance, observing that unilateral lesions are more serious than the symetric ones.

The interest of this study is to notice the trophic role of the autonomic nervous system, in the harmonious growth in which it could act as an organizing influence.

Guy Albot

ERSTMALIGE BEOBACHTUNG VON MALTAFIEBER IN WURTTEMBERG: W. Wundt. Deutsche med. Wchnschr. 80:114 (21 Jan.), 1955.

1953 was the first year, in which the incidence of Maltafever in man was reported in the province of Württemburg, Germany. The author gives a comprehensive description on how Maltafever was brought from southern France, where it is endemic, to the German Rheinpfalz (Palatinate). He quotes other authors, who have treated patients with *Brucellosis maltaensis* in these particular regions.

Four cases of Maltafever are described in detail and the course of the infection is traced. The carriers of Maltafever are sheep. To spend the winter in milder climate some sheep were driven from Württemburg to the Pfaltz, where they acquired Maltafever. After their return these infected sheep had contact with cattle, which consequently contracted the disease. The first patient was the shepherd, the other three patients had attended the cattle. *Brucelli maltaensis* were found not only in the animals themselves, but also in the milk and the cheese produced from the milk of infected cattle.

Therefore the author is concerned that Maltafever may not only be spread by direct contact with the infected animals but also by consumption of their milk and milk-products.

The author further discusses the differential diagnosis of Maltafever and Bang's disease and advises thinking of Maltafever in all questionable Brucella diseases.

HANS J. JOSEPH

STUDIES ON URINARY LIPASE: Martin M. Nothman, Joseph H. Pratt and Allan D. Callow, A.M.A. Arch. Int. Med., 95:224 (Feb.), 1955.

Fat-splitting enzymes occur normally in the urine in a concentration similar to that of the serum. The normal values range from 0.15 to 1.0 units with the method of the authors using olive oil as substrate for the enzyme activity. In order to clarify the relationship of this lipase to pancreatic activity, Methacholine and Secretin were administered after which the amount of urinary lipase increased considerably. The ligation of the pancreatic duct in animals which increases serum lipase rapidly, also augmented urinary lipase for a period of a few days. Thereafter, the amount of enzymes decreased both in the blood as well as in the urine to very low levels. After complete removal of the pancreas the fat-splitting activity of the urinary enzyme disappeared entirely in animals as well as in humans. These observations speak for the pancreatic origin of the urinary enzyme. The clinical importance of the determination of urinary lipase is that it might be increased under pathological conditions of the pancreatic gland without a corresponding elevation of the serum lipase.

H. B. EISENSTADT

METABOLISM

DIE OPERATIVE BEHANDLUNG DES ORGANISCHEN HYPERINSULINISMUS: F. Linder and W. Schmitz. Arztliche Wchnschr. 10:1 (7 Jan.), 1955.

The clinical picture of organic hyperinsulinism can be produced by single or multiple adenomata, more rarely by carcinoma or hyperplasia of the "B" cells of the pancreas.

Of the clinical symptoms the authors especially mention the outspoken tiredness in the morning and the need for glucose as the most significant ones. They also mention dizziness, palpitations, excessive perspiration, neuropsychic changes and coma. In other words the symptoms one gets from an overdose of insulin. Particular diagnostic emphasis is laid on the Triad of Whipple: 1. the presence of the clinical symptoms of hypoglycemia; 2. bloodsugar-findings below 50 mg. per cent in at least two attacks; 3. the considerable improvement of the clinical picture after administration of glucose. The following laboratory tests are also

of diagnostic value: the hungertest (first done at the Mayo clinic), the glucose tolerance test, the insulin-tolerance test, and the adrenalin test.

The authors review the world literature of 697 cases of "B" cell pathology. 529 of those cases presented the picture of organic hyperinsulinism. The great majority of the neoplasmata were adenomata, which were situated 1) in the cauda, 2) the corpus, and 3) the head of the pancreas.

If the curve remains hypoglycemic after operation then usually a small adenoma has been overlooked.

The authors do not approve of the medical treatment with Alloxan. Alloxan damages the normal "B" cells without influencing the insulin-producing tumor cells and may so cause a true diabetes after operation.

Removal of the tumor is the treatment of choice.

HANS J. JOSEPH

MILK-ALKALI SYNDROME: Donald A. Scholz and F. Raymond Keating, Jr. A.M.A. Arch. Int. Med. 95:460 (March), 1955.

Eight patients with the milk-alkali syndrome are reported and the early symptoms of this disorder are emphasized because they are frequently overlooked. They consist of epigastric pain and burning different from typical ulcer pain and occurring even in the absence of any peptic ulceration, general weakness and fatigue, anorexia and distaste for milk, nausea and vomiting, polyuria and dysuria and renal colics. Laboratory examination reveals low specific gravity of urine, albuminuria and presence of formed elements in the sediment, azotemia and hypercalcemia. Serum phosphorus varies, carbon dioxide is normal or low. There is usually an absence of hypercalciuria which distinguishes this syndrome from hyperparathyroidism. The diagnosis is based on the history of excessive amounts of milk and alkali, the laboratory findings and the rapid improvement on a low calcium diet. The question is if a renal dysfunction with impairment of urinary elimination of calcium precedes the development of the milk-alkali syndrome or if all renal pathology follows the excessive intake of these substances cannot be answered at this time. In spite of the rapid improvement seen on all patients the majority show some persistent kidney damage while the others who are clinically completely recovered might still reveal an inability to free the body from excessive alkali as well as calcium when submitted to careful clearance studies.

H. B. EISENSTADT

BOOK REVIEWS FOR GASTROENTEROLOGISTS

DIFFERENTIAL DIAGNOSIS OF INTERNAL DISEASE—CLINICAL ANALYSIS AND SYNTHESIS OF SYMPTOMS AND SIGNS ON PATHOPHYSIOLOGIC BASIS: Julius Bauer, M.D., F.A.C.P., Clinical Professor of Medicine, College of Medical Evangelists, Los Angeles, Calif., etc. Second revised and enlarged edition. 987 pages, illustrated. Grune and Stratton, New York, N. Y., 1955. Price $15.00.

Dr. Bauer needs no introduction to most of us. Physicians who attended his courses in Vienna remember the dynamic individual who was always ready and willing to discuss medical and other matters with the American or other physicians.

Austria's loss is America's gain in having this able physician with us. When he first arrived, he settled in another part of the United States and from there, he moved to his present location, California. Dr. Bauer's wife and son are also physicians.

It would be inadvisable to point out a chapter here or there in this excellent volume. The reviewer recommends that the medical student and the physician begin their reading systematically. For instance, if they are interested in the gastrointestinal aspect of a patient, they should turn to page 731, etc., and then continue with pages 275 and 390. This way they will cover the entire gastrointestinal tract and will learn more than just turning to the page dealing with the symptom presented by the patient.

This book is highly recommended as an addition to the physician's library.

SANDOZ ATLAS OF HEMATOLOGY: 91 pages, profusely illustrated in color. Prepared by the Sandoz Research Laboratories, Basle, Switzerland, 1952. Price $7.00.

This loose-leaf atlas of hematology with its many tables and depiction of the blood in health and disease should be in the hands of all medical students, laboratory technicians, as well as physicians, whether general practitioners or specialists.

An extensive bibliography and cross-index complete the text.

COMMUNICABLE DISEASES: Franklin H. Top, A.B., M.D., M.P.H., F.A.C.P., etc. and collaborators. 1208 pages, 109 text illustrations and 15 color plates. Third Edition. C. V. Mosby Co., St. Louis, Mo., 1955. Price $15.00.

Fourteen new chapters have been added to this (third) edition and one is surprised to find the name of Jonas E. Salk, professor of preventive medicine, included among the collaborators. This shows how up to date the volume is.

Fourth year medical students, public health personnel and physicians in general, will find valuable diagnostic and therapeutic material between the covers.

Both black and white and the color illustrations are excellent. The extensive references and cross-index enhance the value of this monograph.

REPRODUCTIVE SYSTEM: Frank H. Netter, M.D., edited by Ernest Oppenheimer, M.D. Vol. 2. The Ciba Collection of Medical Illustrations. 286 pages, profusely illustrated in color. Ciba Pharmaceutical Products, Inc., Summit, N. J., 1954. Price $13.00.

Physicians who are familiar with Dr. Netter's illustrations of the gastrointestinal tract, which appeared several years ago, will find this new volume even more interesting and instructive. Among the contributors and consultants who made this work possible are Drs. Albert Decker, Joseph A. Gaines, I. C. Rubin and others well known in their special field.

Whether or not a physician specializes in diseases of the reproductive organs, the reviewer urges that this volume should find a place on his desk.

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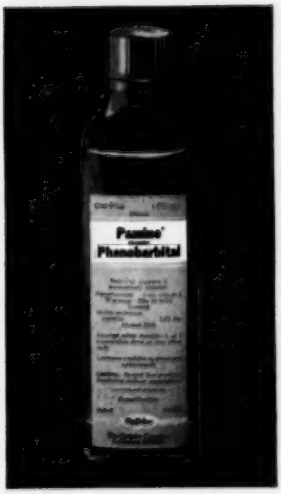

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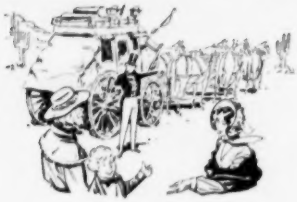

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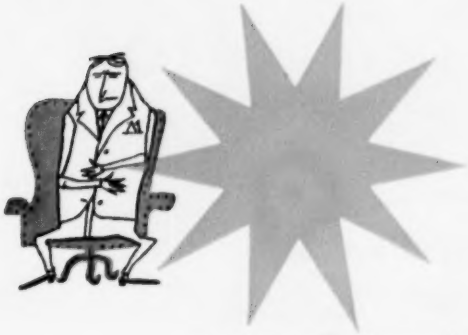

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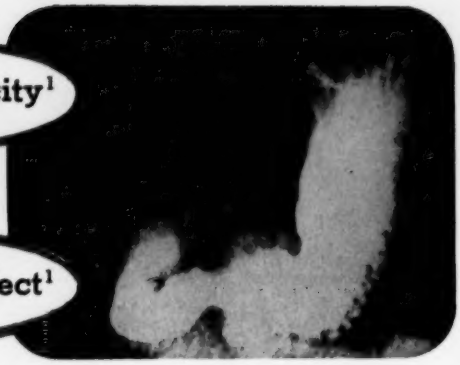

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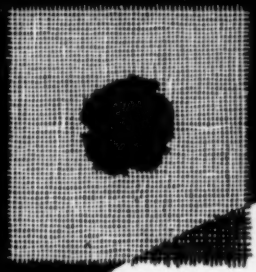

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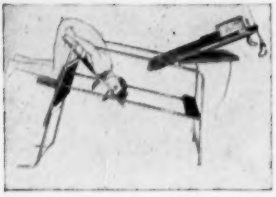

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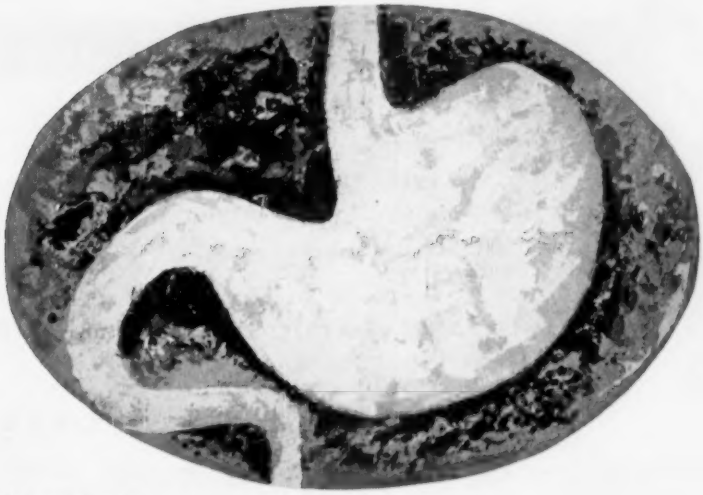

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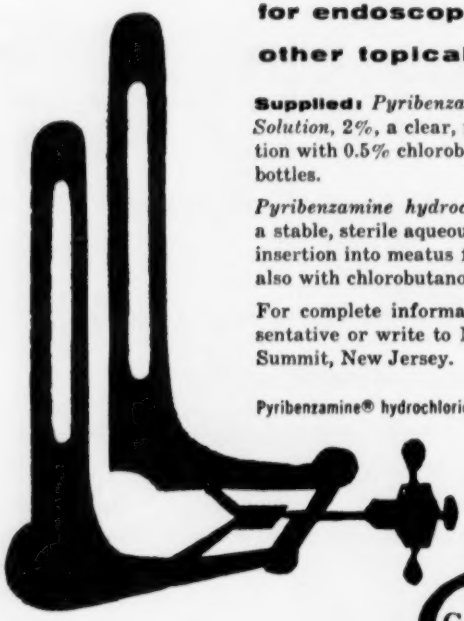

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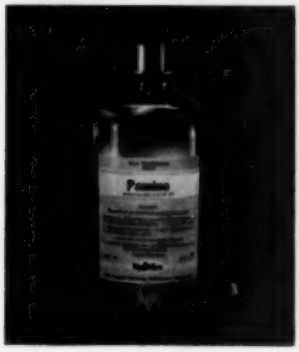

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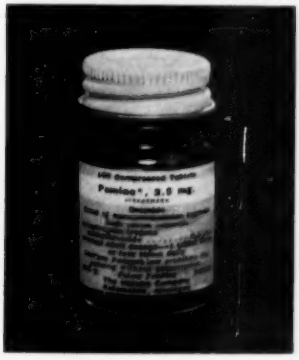
Each tablet contains:
Methscopolamine bromide 2.5 mg.

Average dosage (ulcer):
One tablet one-half hour before meals, and 1 to 2 tablets at bedtime.

Supplied:
Bottles of 100 and 500 tablets.

The Upjohn Company, Kalamazoo, Michigan



Gastric Hyperacidity: etiology

People being people, environmental factors contributory to gastric hyperacidity are hard to remove, even when their role is clearly defined. But, the physician has a sure, simple—even pleasant—way of relieving the acid distress caused by:

- dietary indiscretion
- nervous tension
- emotional stress
- food intolerances
- excessive smoking
- alcoholic beverages

Gelusil promptly and effectively controls the excessive gastric acidity of "heartburn" and chronic indigestion. And it affords equally rapid relief in peptic ulcer. Sustained action is assured by combining magnesium trisilicate with the specially prepared aluminum hydroxide gel.

Free from constipation: Gelusil's aluminum hydroxide component is specially prepared: the concentration of aluminum ions is accordingly low; hence the formation of astringent—and constipating—aluminum chloride is minimal.

Free from acid rebound: Unlike soluble alkalies, Gelusil does not over-neutralize or alkalinize. It maintains the gastric pH in a mildly acid range—that of maximum physiologic functioning.

Dosage—2 tablets or 2 teaspoonfuls two hours after eating or when symptoms are pronounced. Each tablet or teaspoonful provides: 7½ gr. magnesium trisilicate and 4 gr. aluminum hydroxide gel.

Available—Gelusil Tablets in packages of 50, 100, 1000 and 5000. Gelusil Liquid in bottles of 6 and 12 fluidounces.

Gelusil®

Antacid • Adsorbent

WARNER-CHILCOTT